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THE AUTOMOBILE MAGAZINE

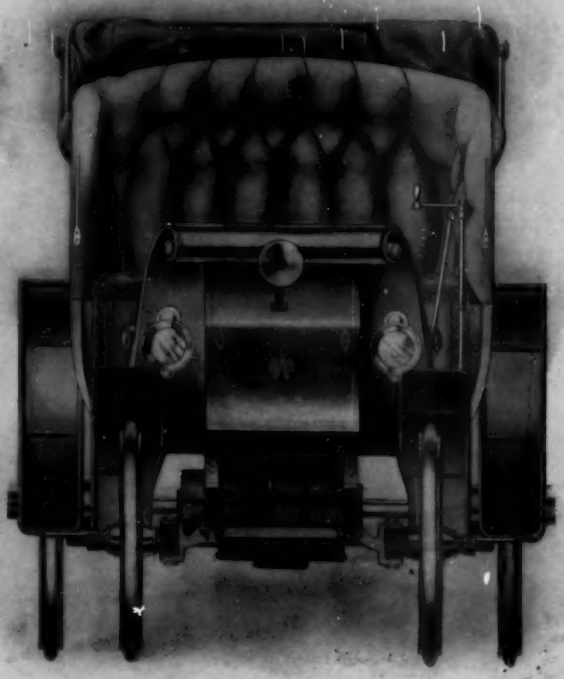
MARCH, 1901

95 LIBERTY ST., NEW YORK, U.S.A.

VOLUME III NUMBER 3

Clinton E. Woods

Automobiles



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The First Public Automobile—Built by Gurney, 1825

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A Few Suggestions on the Operation of a Voiturette

THE voiturette is becoming a favorite with the American public, just as it has with the French, and as a number of American builders are inclined to follow in some degree their general appearance, we give below a few extracts from a series of articles which recently appeared in *The Motor News*, and written by R. J. Mecredy, who is well known as an automobilist. He says: The beginner who takes up motoring is face to face with one serious difficulty. The various manufacturers think it sufficient to issue an ordinary stereotyped catalogue, and perhaps a few brief suggestions, but they publish nothing in the shape of explicit hints and tips as to the actual driving of the vehicle. Unless the beginner has an expert friend to coach him, the result of his lack of information may prove very serious.

In getting ready to start he warns beginners to make sure sufficient gasoline is carried. This can be estimated by putting a clean piece of stick or wood through the aperture at top of tank. After starting, the sparking should be retarded to prevent it from racing. After getting into a steady swing, experiments should be made with the mixture until a normal pace is reached, say of twelve miles an hour, when it is giving best results. The operator should endeavor to get the best possible mixture, and should ever remember that if he is in doubt it is better to err in the direction of too much air than of too much vapor.

When turning corners retard the ignition to slow off the pace. If, however, the corner is approached at a big pace or is reached unex-

pectedly the most satisfactory way to turn is to disconnect the engine, put on the brakes to the required extent and as the car swings round the corner whip the engine into gear again.

The beginner has reason to be very careful in thick greasy mud. If traveling fast a too sudden application of brakes or a swerve to avoid collision may cause the car to swing round bodily and face in the opposite direction. When knocks are heard and no other cause is apparent it is very probable that a fresh charge of oil is needed.

Oil is very apt to get on the drums of the brakes, in which case the brakes become comparatively inoperative. They should be carefully cleansed with petrol—a tooth-brush will be found useful for the purpose—and a small quantity of fresh resin should be applied. Lime, also, will be found excellent for this purpose, as it dries up the oil rapidly and gives a good bite.

The bearings of the wheels should be examined from time to time, to see if they are properly adjusted, and for this purpose it will be necessary to lift the wheels off the ground by means of a small jack. Any unusual grinding noise should be at once seen to, as it may mean a broken ball.

A little petrol squirted into the compression tap in the cylinder, in addition to facilitating starting, serves another good purpose, for it tends to clean the piston rings and the cylinder ; in fact, unless this is done regularly, it is necessary periodically to flush the cylinder thoroughly down with a tablespoonful of either paraffin or petrol, preferably the former, working the piston up and down by means of the handle at the same time. About every five hundred miles it is advisable to open the cylinder and scrape the sooty deposit off the top of it, also to thoroughly clean the piston rings with a tooth-brush and petrol to prevent all chance of their sticking. The top of the cylinder can then be scraped with a knife, and afterward cleaned with a tooth-brush and petrol.

The operator should be very careful not to let the scrapings drop into the crank chamber. In case misfires take place resulting in bad combustion, not only will the valves be covered with a sooty deposit, but the piston and cylinder will suffer in the same manner, and therefore will require more frequent cleaning than when the car is running perfectly. To get at the piston it is necessary to let the water out of the tank. This can be done by disconnecting the joint close to the pump, then all the water pipe connections running to the water jacket should be carefully disconnected, the nuts securing the jacket to the

crank chamber should be unscrewed, and then the jacket and cylinder can be lifted off in one piece.

From time to time it will be found that the circulating pump will leak. To stop this it is necessary to adjust the bearing. In the De Dion it is held in position by a catch working in a ring with depressions in it. This catch will, of course, at first have to be undone and the bearing then screwed up. In process of time, it will be found that the bearing has been adjusted to its utmost, but that the pump still leaks. It will then become necessary to renew the asbestos packing, and at the same time the opportunity should be taken of thoroughly cleaning out the pump. It is difficult to explain the operation here, and, therefore, we fancy it will be best for the owner of the car, after he has made two or three adjustments, to bring it to an expert, and get the latter to renew the packing in his presence, so that he may be able to do it in future himself.

The advice generally given is to pump tires hard, and undoubtedly it is the safest, for a soft tire is liable to puncture on the rim, and will also wear much more rapidly through excessive flexion at the sides, than will one pumped hard. At the same time, there is a happy medium. If the tires are pumped board hard they shake both car and rider terribly. The best practice is to have the tires pumped to such an extent that when the car has got its load on board the depression where the tires touch the ground is just appreciable.

Porto Rico a Paradise for Automobiles

MANY automobilists make a practice of spending the winter abroad, in parts where the climatic conditions are not so severe and trying as here. Among the places most frequently visited is Southern France, not only on account of its beautiful climate, but for the good roads which abound there, together with the beautiful scenery. Others go to Bermuda and Florida, but recent reports indicate that Porto Rico is fast coming to the front as a winter resort. While the majority of the roads are not perhaps adapted to automobiles, what is known as the Coamo Springs Road is a veritable dream, and it is predicted by those who are familiar with the condition of things down there that the island will, in a very few years, become a paradise for automobilists.

Interesting Use of Electric Vehicle

IN this magazine for February, Dr. E. C. Chamberlin in his article referred to the uses which physicians had been known to make of their electric automobiles in supplying current necessary to the carrying out of certain operations incidental to their practice. Below we reproduce a letter which recently appeared in the *Medical and Surgical Journal.* The letter has direct bearing upon Dr. Chamberlin's statement, and will doubtless be read with interest.

JAMAICA PLAIN, MASS., January 17, 1901.

MR. EDITOR: It may be interesting to the medical profession to know of a new use to which the electric automobiles can be put, that will be valuable not only to physicians, but to their patients. For the past two months I have been using an electric automobile, to the exclusion of the horse. On the afternoon of January 10, on visiting a patient, I found it would be necessary to operate upon her that evening. Realizing the seriousness of the case and the delicacy of the operation, for it would have to be a laparotomy, it troubled me a little to know how to provide sufficient light to enable us to explore the abdomen thoroughly and safely, as etherization by gas or lamp light is not without its dangers. About 5.30 P. M., while riding around in the automobile, the thought came to me suddenly that I might utilize the electricity in my carriage to provide light for the operation. I immediately arranged for a long insulated wire about 40 feet, to which was attached an incandescent light with a reflector, using a 52-volt 6-candle-power lamp, also a 100-volt 16-candle-power lamp. I also had several spare ones in case one of them should burn out during the operation.

The automobile was run up on the patient's lawn by the side of the house, under the window, and the wire attached to the battery. We then drew the other end into the second story window, and running a strong line across the room, suspended the lamp from it over the operating table. On turning on the power, we had a most brilliant light, and coming from a storage battery, it was steadier and more uniform than the ordinary incandescent light, lighting the whole room—a large one—and giving perfect light to the operator, so that the laparotomy was performed with ease and comfort. In fact, the light was as good as in any operating room in Boston, and proved

very successful in every particular. We burned it for over two hours, and could have burned it all night if necessary. It was a very rainy night with snow on the ground, which had no effect on the light or battery.

It seems to me that the results of that evening will prove valuable to physicians, because now we may have perfect light in any house, whether in the country or in the city, with no trouble, and the most delicate operation may be performed as easily and safely in the night as it could be by daylight. An automobile may be taken anywhere for such purposes, and surely this makes the electric carriage of even more value to physicians. Other fields are thus opened up for their usefulness to us which I will not enlarge upon at this time, but will simply mention the possibilities of utilizing them for cauteries, giving electricity to patients, etc., by attaching the proper appliances to them, which can be done easily and readily.

Very truly yours,

JOSEPH C. STEDMAN, M.D.

Sixty Miles for Sixty Cents Over Long Island Roads

By H. B. FULLERTON

ROADS there are of every description—clay, sod, sand, loam, cinder, shell, gravel and stone. These, like everything else, divide up into two classes—good and bad, and while there may be many degrees of badness, there certainly is but one kind of goodness. As applied to roads the goodness must not be intermittent, but remain good the year through.

Vehicles like roads are of many kinds, but unlike roads cannot so easily be separated into two great classes, principally because of the many men and their many minds. The ox cart, the sulky, the bicycle, the automobile, and even the baby carriage, each has its loyal supporters. The practical automobile, however, is a vehicle on which all eyes are at present centered. Its possibilities are marvellous. Perhaps the greatest good to be accomplished by it is in the improvement of the health statistics of great cities, inasmuch as it undoubtedly, when perfected, will do away with the horse for transportation of merchandise. Next perhaps in importance is its value to the agricultur-

ist or producer in carrying his crops or products to the railway or steamship line, and its use on stage lines for transportation of passengers. However, it seems no more than proper to place its second great point—utility as a feeder to the great railroad systems of the United States. It will always have strong competition from the horse-drawn vehicle as a source of pleasure, but in touring, especially for long distances, it will undoubtedly be a tremendous success. Like the railroad train, which is very closely connected with the automobile, in many, many ways, it can make shift to get along over a bad road, but to be at its best, again like the train it must have a good roadbed on which to travel, consequently a territory presenting a large mileage of improved highways, together with varied scenery and good hotel ac-

On Long Island for Pleasure

commodations, will be sought for and become the Mecca of the automobilist or chauffeur. (Can we Americans not find an English word, or coin one, to do away with such awkward words as these?)

Long Island presents conditions that fulfil in every respect the requirements of the user of the motor vehicles. Its great system of fine hard highways, good at all seasons of the year, its three main or trunk lines, together with the many roads crossing the Island, give a touring ground, that while close to America's greatest city, enables one to travel a country unique in its attractions. The Merrick, or South Shore Road, being almost level, running through many beautiful villages, almost constantly in sight of the ocean and Great South Bay, with its numerous inlets. The Jericho Pike, passing through farm land

and fruit sections of the Island; the Sound Road of the rolling North Shore with its beautiful wooded hills, quaint villages, magnificent views of the Long Island Sound and the New England shore, and the beautiful bays and headlands of the Sound shore.

A tour of between 250 and 300 miles can be laid out, at no time carrying the traveler more than 35 miles away from the city, and without retracing or doubling back over the same road.

The writer recently made a trip, which was virtually a test of a new motor vehicle traveling over the improved streets of Brooklyn and good roads of Long Island. This vehicle was a four passenger surrey built by the Long Island Motor Vehicle Company, which designates its various vehicles by well known Long Island names, the surrey, for instance, being called "Montauk."

Mr. F. G. Webb, Chairman of the Technical Committee of the Long Island Automobile Club, handled the steering lever throughout the run. Mr. Charles Rockliff, the engineer of the company, was one of the party, and had everything necessary to make any ordinary repairs. Not once in the trip, however, was his knowledge called into requisition. The run of 63 5-10 miles was made without a mishap, without stop of any kind except to take photographs or make a call, and, of course, the usual dinner stop. As the writer has had several most unsatisfactory experiences traveling in motor vehicles, many notes were kept which may prove of interest to your readers.

The absolute mileage, which has been checked many times by cyclometer and odometer, was 63 5-10 miles. The number of passengers carried was four, the fourth one being Mr. A. R. Pardington, of the New York and New Jersey Telephone Company. The actual running time was 5 hours and 12 minutes. The total weight of carriage including top, robes, filled tanks, etc., was 1,800 pounds. Weight of passengers, 690 pounds; average miles per hour, about 14¼; total amount of gasoline consumed, 4½ gallons; cost of gasoline, 14 cents a gallon; average number of miles per gallon, about 14⅛. With the figures herewith given it is easy to compute the cost per mile in full, which was a little under one cent. Several miles, where the roads were free of horse-drawn vehicles were made in very close to three minutes. This included slight grades and rounding of curves. No attempt was made to drive the vehicle at its full speed. Through villages, etc., it was slowed down to about eight miles an hour. No special running ground was selected, the regular route being followed from Brooklyn City Hall to Jamaica. Here Hillside Avenue was taken

to Hollis, Long Island, then by the Old Plank Road, or Hempstead-Jamaica Turnpike, as it was known (now Fulton Street, paved with brick and Macadam) to the Y at Queens, where the Jericho Pike branches to the left and the Hempstead Road continues to the right. The Hempstead Road was followed to its intersection with the Springfield Road, then over the Springfield Road to the Merrick Road, and over the Merrick to Rockville Centre, side runs being made toward Long Beach and Rockaway. The vehicle backed, turned sharply and

On Long Island for Glory

took sharp grades from the highway into private carriage roads. During the whole trip no horse was unduly alarmed, in fact the horses of Long Island seem to be growing used to the automobile, or, at least, automobiles do not seem to create as much consternation as the bicycle did in 1896 and 1897.

Many who only know of Long Island as a racing ground for all sorts of vehicles, have an idea that all its roads are absolutely level. Let those who think this turn left at the Old City Hall at Jamaica and take the road through Flushing to Bay Side, Little Neck, Roslyn,

Wheatley Hills, and run down to Oyster Bay or on through Cold Spring to Huntington. They will find grades with magnificent trees that will astound them. Let them take the cross road from Springfield through Queens and up the Rocky Hill Road, let them turn off at Hyde Park and take the road that passes by Lake Success, a resort famous in revolutionary days. In fact let them cross where they will, in going from the South Shore to the North Shore they must climb over the backbone of Long Island. From the top of many of these hills they can see both the ocean and the Connecticut shore, and like the cyclists who love the beauties of a hilly, wooded country, they will find that a brake is a most valuable article to possess.

The National Capital Automobile Club

THE National Capital Automobile Club was organized at Washington, D. C., February 1, Lieutenant General Nelson A. Miles being chosen president, and a constitution and by-laws was considered as reported by a committee consisting of General Miles, Colonel Henry May, Dr. Aspinwall and Lieutenant H. H. Ward. The chairman, Mr. Charles E. Foster, called attention to the fact that the County of Hertford, Maryland, had just come into a bequest of $50,000 for improving its roads, and suggested that efforts should be made to secure the application of the appropriation to the main road between Baltimore and Philadelphia ; also that the largely increasing appropriations for rural free postal delivery would demand the improvement of roads and that efforts to secure such appropriations might be made dependent upon county or State improvements of the roads used.

A committee was appointed to protest against the bill taxing and tagging automobiles in the District of Columbia and to advocate the Senate bill 5,427, permitting the transport on steamboats of automobiles storing gasoline.

Thirty-two of the sixty available spaces at the Chicago automobile show to be held in March, this year, have already been applied for, although the blanks were not mailed before November 23, last. The applicants who have already expressed a desire to show will exhibit steam, gasoline and electric vehicles, and accessories. Application has been made to the traffic associations for reduced rates from all parts of the country, it being probable that there will be a large attendance of dealers.

Experiences With First Machine In a Connecticut Town

By F. W. MANROSS.

THREE years ago I had the pleasures of a pioneer in introducing the first automobile seen in this vicinity. Needless to say it attracted much attention. It was a novelty that appealed strongly to everybody, and afforded the Connecticut Yankee an opportunity to open his famous question box. Possibly my experiences may prove helpful and interesting to others. It was in the fall of 1898, when I purchased a Winton automobile, and at once put it into active and hard service, running it over all sorts of roads, until October, 1899, when it was sold. In the meantime the machine had made a record of 3,500 miles. Another automobile of the same make was immediately purchased, and up to date, has been run 4,000 miles. All this distance was covered without mishap of any kind, without accident, injury or repairs. Our roads are extremely hilly, often rough and sandy, but the machine was never stalled by mud, sand, snow or heavy grades. The total casualties were: one hen killed and one runaway of a milkman's horse that had been left unhitched by the roadside.

On good roads an exhilarating speed was quickly attained, a speed to the limit of safe highway travel. On one occasion the distance from my home to Hartford, 18 miles, was covered in 55 minutes. At another time I made the run from Forestville Center to New Haven City Hall, 32 miles, in 1 hour and 51 minutes. My best continuous run was 40 miles, without stopping to take on water or gasoline. On another occasion I made a trip of 63 miles on 13 quarts of gasoline, costing 54 cents, an average of about 8-10 cents per mile, which also covered cost of lubrication. My average running time has been 15 miles per hour, over all sorts and conditions of road.

At the time of the "Post" automobile parade, in Bridgeport, last summer, my machine was the only one in line, from a distance, that made an actual road run to that city. And the road from Forestville to Bridgeport, about 50 miles, is a very hard one much of the way. After the event the journey was continued to New York. Return trip was made on a very hot day, the thermometer registering 98 degrees.

It was one of the hottest days of the summer, but we easily made the run, without any "record" idea, from New York city to Morris Cove, New Haven, Conn., in actual running time of 6 hours and 10 minutes.

I have found the cost of gasoline for power so small as to be of no moment. The chief item of expense and the leading problem is that of tires.

At first, in extreme cold weather, some difficulty was experienced in starting, but I soon discovered that a little hot water poured over the carbureter and inlet valve made a wonderful improvement and obviated all difficulty. I would emphasize the importance of keeping the automobile in a reasonably warm place in cold weather, so that the machinery and gasoline will not become filled with frost. If a moderate temperature is maintained and a little hot water used in coldest weather, as suggested above, the machine will be found always ready for instant use, and no delay or inconvenience will be occasioned.

When the machine first appeared on the road horsemen evinced considerable timidity, but a little consideration and thoughtfulness soon brought confidence to driver and horses. It was noted that thoroughbred animals paid little attention to their latest rival, while plugs and farm horses became wildly excited and furnished many laughable incidents. On meeting children or ladies driving it was always the rule to stop the machine and lead the horse by, if necessary. Once two ladies and several children incontinently jumped from their carriage and fled over the fence as I approached and stopped the machine, while their horse looked calmly on. Their excuse for their actions was: "We were afraid he would run away!" It occurred to me that they had given the animal a mighty good chance. One Sunday my wife and myself—for she runs the machine successfully—were out for a spin on the Southington Road, when we met an aged couple driving to church. The old gentleman was so intent on gazing at the automobile that he turned the horse into the ditch, and he and his mate were spilled out. The old lady was provoked, and shrilly declared, as she picked herself up:

"Ye have no bizness on th' road drivin' wan of thim things widout a horse."

"They do have a right on th' strate," protested the old man; "I have seen thim before."

"Ye have not, thin," she retorted. "It was a throlley car ye saw!"

Just then a friend in the rear came upon the scene with another

machine. The old lady threw up her hands, and said in a tone of utter helplessness:

"Oh, my Lord, there is another wan! What will I do, what will I do!"

While this little drama was being enacted the horse was comfortably eating grass. We left the pair hotly arguing as to whether or not the old man had ever seen "wan of thim before."

On another occasion, while *en route* through Cheshire, we noted two men in the distance holding a seance with a horse. Getting nearer we saw that they had hurried the sorry equine, that would'nt have been surprised at an earthquake, to the roadside, and covered its head with a blanket.

Passing over the Hartford turnpike one day we wheeled by a farmer plowing. He did not see us, but his horse did, and promptly bolted, broke the harness and fled, while the farmer, amazed and bewildered at the unheard antics of the always placid beast, continued his grip on the plow handles, unable to realize the cause of the outbreak, and helpless astonishment pictured in his face.

One of the most amusing roadside experiences, and one that illustrated the frequent folly and unreasonableness of drivers, happened while returning from New York. Along a narrow country road we encountered a fellow driving a colt attached to a hay rake, that required the full width of the road. We called to him to turn into a near-by lane, but he declared that his horse had got to pass that machine. But the colt felt otherwise. Despite a lively whipping, it backed up a steep bank, the rake doubling up on the driver and shutting him in a trap. As we shot by we got a fleeting glimpse of a machine, horse and man in a wild tangle, from which issued a volley of emphatic expletives.

Another humorous incident happened on the Harlem bridge, in New York. As we rolled over it we encountered a diminutive pony, drawing a little cart, in which were two heavy men. The pony refused to face the automobile, and suddenly turned about and darted back over the bridge, despite the efforts of the driver. After quite a long chase we overtook the outfit, the occupants of which looked black. We could'nt resist the temptation to ask: "Why didn't you sit on the pony?" The indignant reply was not caught.

Such experiences might be recorded indefinitely. They undoubtedly add to the enjoyment of a ride. But as automobiles become more numerous and commonplace these features of a run disappear.

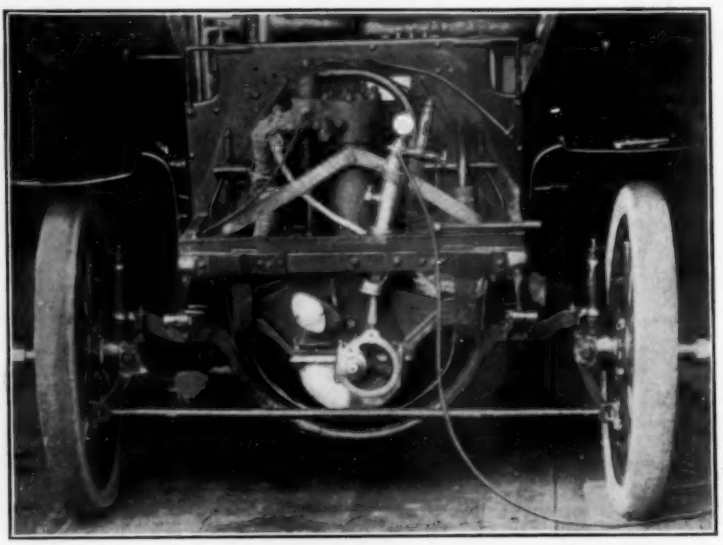
The use of my machine has not been confined wholly to ordinary road use. It has proven itself admirably adapted to hunting and fishing trips, a fact that should interest sportsmen. On these journeys it was run over all sorts of woodland paths, through brush and woods, and was found to be more easily handled under adverse circumstances than a horse.

In conclusion I can only add that we have derived much pleasure from our Winton. We have found the automobile practical for business and for pleasure; under all conditions of weather and road it has met the demands placed upon it. It furnishes an ideal method of travel. With intelligent and careful use the automobile will prove of real benefit and utility to the fortunate possessor.

A Handy Tire Pump

PERHAPS there is no one part of an automobile which is the cause of so much anxiety and annoyance as the tires. It does not matter how perfect running a mechanism you may have, you are bound to fall heir to troubles if you do not have good, reliable tires. The tire problem is the burning question of the hour, and manufacturers would do well to give it all the attention it deserves.

The writer has had a number of unpleasant experiences, all more or less due to tires. Inasmuch as this is true, the next thing for an



Pump Arrangement on "Sir Charles"

automobilist to do is to be well prepared to rectify any trouble emanating from his tires. In this connection we take pleasure in presenting an illustration of a tire pump which E. W. Kennard, the well known English automobilist, has had fitted to "Sir Charles," the winner of the second prize in the 1,000-mile trial, held last year under the auspices of the Automobile Club of Great Britain.

Anyone who has been compelled to inflate a 4-inch tire on a cold

day, equipped with only an ordinary foot pump, knows it is anything but a pleasant task, and the pump used by Mr. Kennard not only does this without the expenditure of exertion, but in much less time. The pump is operated by means of the eccentric, which is fitted on the main shaft of the engine. When it is necessary to "pump up," the hose is connected with the tire in the ordinary manner, and the engine started. This device saves a great amount of trouble, and illustrates how individual automobilists may, by the cultivation of their inventive faculties, make their vehicles more convenient, and less liable to produce trouble. The idea is an excellent one.

Bicycle Show at Madison Square Garden

THE recent Bicycle Show at Madison Square Garden was in every respect successful, and as one entered the spacious area a very pretty and striking scene struck the eye of the visitor. The array of wheels was very complete. Most of the old, reliable makers exhibited, such as Columbia, Rambler, Cleveland, Crescent and many others. The decorations were exceedingly pretty, and very tastefully arranged.

Souvenirs were the order of the day and night. These were of different kinds—from badges to carnations, the latter being pinned to each souvenir hunter by two pretty young ladies.

There seemed to be a greater seriousness on the part of visitors than in former years.

Conspicuous by its absence was the racer. Most of the wheels shown were of the roadster type. Perhaps the most notable features of all the wheels were the use of gears instead of chains, the cushion frame, and the adoption of the coaster brake.

The automobiles present were not numerous, and came from the following concerns: Mobile Company of America, Grout Brothers, Loomis Automobile Company steam vehicles, American Bicycle Company, Manhattan Automobile Company, Boston Motor Carriage Company electric carriages, and the Warwick Company, which had a gasoline machine on exhibition. No track was provided, and in this respect the manufacturers were hampered, it not being possible to show the machines in motion.

There were a number of motor bicycle and tricycle makers represented, as well as manufacturers of both automobile and bicycle accessories.

Motor Vehicles for Public Service

THOSE familiar with automobiles will recognize that the application of motor vehicles to the carrying of passengers much in the same way as do omnibuses, is receiving much attention at present. It is, of course, true that there are localities where automobile 'buses can be used to advantage. In view of this, we take pleasure in presenting the paper of Mr. Rowland Outhwaite, read by him recently over in England. The author has, since 1897, been interested in this phase of the automobile business. The title of his paper was, "Motor Cars as a Substitute for Tram Cars for Public Conveyance."

He said: "In July, of 1897, I entered first upon my motor car career, buying from Stirlings, of Hamilton, a four-seated Daimler wagonette. In this car I covered in the following eighteen months over 20,000 miles—in fact, having little else to do at that time and being anxious to gain experience, under all conditions of weather and roads, in an industry I felt sure was bound before long to be a large and important one, I left no stone unturned to attain my object. I merely state this by way of preface to show what led me up to associate myself with the company with which I am now connected, when the same came before the public in May of 1899, to run motor cars on the same lines as street cars. I do not want, however, to trouble you now with the history of our individual company, but showing as we do after eighteen months' business, I am only too sorry to say, a loss, I would like to point out, so far as I am able, the reasons for it, and I would then, with your kind permission, make a few suggestions for the future.

"In view of the fact that representatives of various manufacturing firms are present, I would ask them kindly to remember I do not wish to speak pointedly or with special reference to any one firm, and I would ask them to accept the suggestions made in the spirit in which I can assure them they are given—for our mutual benefit.

"One other point, gentlemen, I would ask you to remember, and that is that I am dealing solely with the one type of car—that driven by oil. To come back to the point again—viz., 'The causes of failure.'

"Firstly—The cars as at present built for public service work are,

as regards strength, out of all proportion to the work they are called upon to do. To put it a little more graphically, it is like going into action with a gun mounted on a 'Victoria' and drawn by a pony. I am sure, gentlemen, you will agree with me when I say that the labors of Hercules were nothing to those of anyone running to-day twenty or thirty cars for public service—unless of course it was done absolutely regardless of cost. We are to-day attempting to run at a profit cars, originally designed for four passengers, with loads of eleven and twelve persons, to say nothing of a hood in bad weather. The same engine, the same gearing, the same sized bearings, the same section of rubber tire, the same chains, are to-day fitted to my largest public service car as are fitted to my own two-seated car. It is obvious, then, gentlemen, one of them is wrong, and it is obvious which it is when I tell you that the former costs me nearly as many pounds to keep up in one month as my car costs me shillings in a year.

"Secondly—Even though the existing type of oil public service car was built heavier throughout, and a more powerful engine substituted, I find from experience the design in many vital points is not suitable for this particular class of work, owing to (1) constant variations in load; (2) incessant starting and stopping; (3) lack of really competent drivers, the latter being a point I will touch on later.

"Take point No. 1. A driver adjusts his brakes and chains before leaving the depot. He procures a full complement of passengers—10. With what result? Chains go out of adjustment and the brakes rub on the tires. This must be obvious to the makers, gentlemen.

"Point No. 2. Except with careful drivers, the continual starting and stopping, compulsory in street traffic, is a severe strain on nearly the whole of the car, and I believe this factor has almost more to do with the rapid deterioration of the cars than anything—very often, too, it is absolutely necessary to pull up suddenly to prevent accident.

"Lastly—Drivers. I have given this question most careful thought and attention. Not being able to alter the defects in the cars, I tried the only other remedy, to improve the drivers. In this I was partially frustrated, for I found—after carefully training men and giving them every possible encouragement to make themselves efficient, not only as drivers but mechanics, other small companies started up with three cars here and three cars there, and by means of an extra shilling a week and the promise of a new car, I found my best men leaving me, and then I had to start at the bottom of the hill again.

"I firmly believe the motor industry, and motor public services,

have suffered more through bad drivers than anything, and I would take the liberty of urging you, gentlemen, not to certify a man to be an efficient driver when he is far from it. I can honestly say I have had many men come to me with excellent characters, who when I asked them the simplest question were absolutely at sea. After a driver has been with me a considerable time, and besides being a good driver, is capable of doing his own repairs, I give him a printed certificate which, so far as his efficiency goes, is his character.

"There is one other important point which I must not omit—tires. I think I have tried almost every make at every price. The tire which to-day gives me by far the best results is the 'Castle' vulcanized tire, supplied by the North British Rubber Company. If the ordinary 'Clincher' section is used, I should most certainly advise nothing under a 3-inch section on the driving-wheels—and would even prefer 3¼-inch or 3½-inch section. I think I have said enough about the bad points. With your permission I would throw out a few suggestions for a future car suitable for the work, and with which I am confident it would be more than possible to compete with any existing tramway company in the country. The carrying capacity of the car should not be under fourteen passengers, so as to admit of a conductor being carried.

"To carry this number of passengers I do not think anything under a 12-b. h.-p. motor should be used, but I am strong on the point that only an engine with two cylinders be employed. All working parts should be encased, and while electric ignition might be used to advantage, I certainly am of opinion tube should be fitted as well. It should be made impossible for the driver to increase the speed of the engine above normal. All wearing parts must be accessible, adjustable and easily and cheaply replaced. One of the greatest drawbacks of the present public service car is the time lost gaining access to various parts. I think a good many of the present-day evils could be got over by having the existing shaft stationary horizontally, and instead of sliding the shaft and friction clutch together, slide the clutch itself along the shaft. The connection to the road wheels would, I think, be better with gearing in place of chains.

"As regards lubrication, this should be done from one oil reservoir with pipes leading to all the journals. While I have always found the "Stauffer" lubricator very efficient, the time taken to grease twenty cars is very considerable. A car on these lines being built, let us consider the advantages of the motor car for street traffic, which is obvious. You have all the advantages of the 'bus, in that your cars can

run on any route according to the requirements of the traffic, and moreover you take your passengers direct from the pavement.

"It is not necessary to upheave your streets and spend hundreds of thousands laying rails, building power stations, etc. With the finest mechanical tramway system yet produced, one accident at once disorganizes the whole system, as we see very forcibly in Edinburgh nearly every day.

"The cost per mile of running a good car is about two-thirds of a cent,* which I think compares quite favorably with any tramway system. For suburban traffic motor cars seem particularly suitable, as passengers can be conveyed with safety at a greater speed than would be possible or safe with any other vehicle. For three months last winter I ran such a service to a small village three miles from Edinburgh, with a time table, and as I brought people into town in twenty minutes, as against forty by 'bus, I charged an extra halfpenny over the 'bus fare. This the people resented, so I withdrew the cars for another service.

"I have already taken up too much of your time, gentlemen, but in two words I would like to tell you the means adopted by my company to overtake and check repairs and fix responsibility. When each car comes in at night, the driver is given a 'report' sheet with a list of all the main parts of the car printed. Opposite any part which needs attention he makes his remarks. The foreman makes an extract of these, and allocates the work among the night engineers. The head engineer hands a report to the foreman in the morning, stating all the work done, and by whom each respective job is done. When the driver takes over his car in the morning, he is given back his previous night's report sheet. On the bottom of this is a place for him to fill in any items which he reported which had not been given effect to, and that clears him from responsibility in case of accident.

"My company has carried over 5,000 passengers in one day, and over 1,000 in one car in one day. We had cars last year as far north as Inverness and as far south as here, and, I am pleased to say, without a single exception, we have never injured in the slightest degree any passenger—which is a tribute to the men employed by our company.

"I would again thank you for your kindness in giving me your attention, and I can only trust that the motor industry, in all its branches, will prosper as it should and is bound to do."

*Mr. Outhwaite here referred to cost of petroleum spirit only.

At the close of the address, the paper was very freely discussed by Messrs. Richardson, Hutchings, Edge, Morris, Rollo, Gretton and French.

A story has been going the rounds of the automobile papers to the effect that Harvard University has found it impracticable to continue its veterinary department, there being only seventeen students who care to devote themselves to the ailments of the horse. This is owing to the fact that the young men, recognizing the growing popularity of the automobile, believe it would be better to study mechanics than the poulticing of horses. One of our English contemporaries, the *Motor Car Journal*, in commenting upon this, says that this statement, like many reports from the United States, seems hardly credible.

Senator Platt recently introduced a bill to Congress which proposes to remove the difficulties and inconvenience caused to owners of automobiles, caused by an act which practically prohibits the taking of machines using gasoline across on ferryboats without first throwing out the gasoline. The bill, as introduced by Senator Platt, if carried through, will remove this difficulty. The wording of the section covering the point in question reads:

"Nothing in the foregoing or following sections of this act shall prohibit the transportation by steam vessels of gasoline or any of the products of petroleum when carried by motor vehicles (commonly known as automobiles) using the same as a source of motive power; provided, however, that all fire, if any, in such vehicles or automobiles be extinguished before entering the same vessels, and that the same be not relighted until after said vehicle shall have left the same."

One Season's Experience With a Steam Carriage

By P. T. REES

I HAD some new experiences during the summer of 1900; some have been of the most delightful sort, others have been provocative of remarks which were positive evidence of good faith, but not meant for publication. It all depended upon whether the 'bile worked according to catalog or according to the perversity of inanimate objects, perversity in inanimate objects really meaning faulty design, poor material, or poor workmanship, or all of them.

I prefer in this case to designate my machine as a 'bile; it will do as well as to give the correct name; it's shorter, and besides doesn't inform the reader as to which particular one it is of the half score or so of steam carriages, all cut off the same stick and subject to the same disorders.

I have run my machine, during the past summer, more than 2,500 miles, over all kinds of country and all kinds of roads, and although I have at times felt inclined to dynamite the thing, I've had pleasure enough when it did work smoothly, to compensate me for the troubles —especially after the troubles were past. I can say, however, as the result of my experience, that no one should start on a tour with a steam carriage, as steam carriages are known to commerce at the present time, who is afraid of soiling his hands, and, in fact, when going on a long trip, a suit of overalls under the seat cushion may and probably will be found very useful. Nor should any novice undertake a lengthy tour in one of these machines with expectations of unalloyed pleasure.

Unless the operator has had previous experience with steam machinery, or has at least studied and familiarized himself with the machinery of his carriage, his chances for an enjoyable trip are slim. It is a pity that this should be the case, for steam engineering is hardly in the experimental stage, and there is no reason why these steam carriages should not be designed and built so as to be free from the petty troubles with which the present productions are likely to mar the most enjoyable recreation I know of. And yet, in spite of the petty defects, the result of my observation and experience convinces me that steam is the proper power for a carriage in which to travel at will throughout the country; if the steam machines were designed and built as they

could and should be, I feel confident that the ranks of the steam sect would be swelled rapidly with proselytes from the faiths of internal combustion and electricity.

When I purchased my machine, I started to run it home myself. I had had some experience, theoretical and practical, with steam; I have even ridden a few miles in the cab of a locomotive, and I felt myself competent to handle anything that went by steam on dry land. I had talked with a number of different "demonstrators" and "instructors" representing several different makes of the same kind of machine, and I didn't really feel that they had any light to impart to me that they were likely to impart—and I think so yet. I have seen but just one "instructor" who seemed to be anything else than an expert bicycle rider who had become equally expert in handling a steam carriage, so long as everything worked as it should. The one exception was evidently a practical and competent mechanic, who was really capable of instructing; he was sent out from a local agency.

It was late in the afternoon when I started, with a companion, and darkness soon overtook us, bothering me to see the height of the water in the glass; just one instance of the convenience of having gage cocks, but I got along fairly well by reflecting the light from the side lamp with a small hand mirror purchased at a roadside country store. We were assured, before starting, that the water tank held sufficient water to run twenty-five miles. We climbed some hills, ploughed through some sand and found the tank empty in about twelve miles. But we didn't get home that night; we stabled the 'bile at a hotel, and I went to bed to dream until morning of driving a steam carriage at phenomenal speed over strange roads in which huge rocks, trees, stone walls, and other formidable obstacles were constantly appearing directly in front, but which were always most miracuously dodged. It was an entirely strange road we had been traveling.

Next morning it took over half an hour to get up steam enough to turn on the main burner; something had clogged the "torch," and as there was present during the operation a numerous, inquisitive and suggestive audience, we did not enjoy it as thoroughly as we might. When I reached home I took the torch apart, cleaned it thoroughly, and when put together again it would get up steam in four or five minutes; but I find it is subject to such stoppages, which sometimes can be removed by forcing air through it with a large air pump, and sometimes can't.

We got started finally, and after covering four or five miles of

macadam at a good rate, the pump stopped working, or at least failed to keep up the water, which began to fall steadily in the glass. I kept going as long as I dared, then stopped, turned off the fire and began to investigate. I soon found by opening the drain cock in the expansion loop of the feed pipe, that water was not running from the tank to the pump, and as the tank was nearly full of water, and the tank valve was open, it was obvious that the passage was somewhere obstructed. I couldn't reach the opening to pipe from the filling hole as the wash boards were in the way, but I finally discovered another hand-hole in the front of the tank, under seat, and directly over the pipe. Here I found an exceedingly fine gauze strainer, brazed in and covered with dirt of various kinds, which I scraped off as best I could with my finger nails, then punched the strainer full of holes with a wire nail. In its place I have had a fine gauze strainer made to fit the filling hole of the tank—kept the dirt out of the tank after that, and ripped the original strainer out altogether. There was no provision made for washing out the tank when the thing was built, all the dirt in the waters of creation had a fair chance to get into it, and the strainer put in by the builders, who boast in their literature of the vast amount of gray matter expended upon each one of the several hundred parts of the machine, wouldn't let a molecule of such dirt get out again.

The pump is one of the most troublesome features of these machines. The "auxiliary" hand pump, put on avowedly to pump up the boiler when standing or when cold, is used by the fellow who has it to do a portion of the work which the feed pump should do, but doesn't, while the fellow who has neither the auxiliary hand pump nor an injector, raises up the back wheels, or one of them, or else blows off the steam, siphons the boiler full, and fires up again. Either operation is very amusing—to the spectators—and the fact that nearly everyone who is watching the process tells of some other fellow he saw just the other day in just the same predicament, doesn't seem to have the tranquilizing effect on one's mind and language that the narrator appears to expect. The stroke of the feed pump is too short and the speed too great to be effective, and it is almost impossible sometimes to work out a bubble of air which gets trapped, especially on a hot day when the water gets low in the tank and too hot to bear one's hand in it for longer than a moment. Although I soon learned to gage the consumption of water quite accurately by the road over which I was traveling, I seldom allow my tank to get more than half

empty when touring, and seldom pass a good place to fill up; thus keeping the water cooler in the tank and avoiding some trouble with the pump. At its best, the pump on my 'bile will not supply water to the boiler as fast as used on continuous hard pulling, as up long mountain grades, or through long stretches of sand, while on good and fairly level roads I can set my by-pass and not disturb it for miles unless the pump quits altogether.

I had heard and read of several instances of steam carriages running backwards on steep grades and was puzzled to account for it; but on a trip among the mountains of Northern New Jersey, far from macadam roads, I discovered the reason. I attempted to climb a hill which looked easy, without having full pressure of steam. These little machines are great climbers, so long as they hold their steam (which isn't long on a hard hill) and with an extra large sprocket wheel on the driving axle and without a passenger, I could run my 'bile up the face of Madison Square Garden tower without an incline, providing she could get toe-hold, and the steam lasted. This particular hill proved steeper than it looked, and the surface was far from smooth; steam went down to about 110 pounds, and I stalled, with the throttle wide open. Knowing the inefficiency of the common band brake for the backward motion, I left the throttle open to assist the brake in holding the carriage until the steam ran up again, and paid no attention to the slight backward movement, as I expected the combined efforts of the brake and throttle would stop her in a few inches.

My companion made some remark about getting out to push, and I turned my head to reply, when suddenly the 'bile gave a leap backwards and started down the hill again at a surprising rate. Fortunately the road was straight at that point and I had time to see that the reverse lever had jumped back and that my machine was going down hill backwards with the throttle wide open. I quickly threw it ahead again and held it there until we stopped; by which time we had steam enough to go on. With a link motion engine the valves have a tendency to drag the reverse lever forward when the engine is moving forward, and backwards when turning the other way, and it was clear to me then how the man I had been told of a day or two previous, had been run away with backwards on a steep hill, and had brought up into a mill race beside the road. When I got home again, I drilled some holes in the quadrant, against which the reverse lever bears, just large enough for the pin which projects from the inner side of the lever to enter; now my reverse lever stays where I put it.

My 'bile has the single bar or "slipper" guides, and they and the crossheads are too small—not enough bearing surface, wear rapidly and run dry in a dozen miles. They should have oil cups. The other bearings, under ordinary circumstances, will easily run twenty-five to thirty miles with a drop of oil.

With a companion, I made one trip of nearly 500 miles up the east side of the Hudson to Albany, thence to Troy and Bennington, Vermont, and back by the same route to Albany. From Albany we returned via the west side of the river to Kingston, thence via Ellenville to Port Jervis, along the Delaware to the Water Gap, and home across New Jersey. It is a delightful trip, through a most beautiful country and over roads good, bad and indifferent. In this trip, we stopped over night at Peekskill, and in the morning found that rain had fallen during the night. We climbed the hills in the Highlands (of which my companion said that some of them were so steep that they leaned over backwards on top) with some help in pushing on his part, and got along fairly well until above Fishkill. Above Fishkill the road is a beautiful one in good weather, with magnificent trees arching over it much of the way; but the rain had been heavy during the night and the roadbed was covered with slimy mud an inch or two in depth, through which, owing to the side slipping, it was impossible to make any kind of time, and we didn't strike dry roads again until we were near Hudson. At Hudson we took a supply of gasoline and started for Albany, which we were desirous of reaching that evening; but the machine would't make steam a little bit. I couldn't get more than eighty pounds at most, and our progress was necessarily slow; we didn't reach Albany until 10 P. M., and there was no good place to stop between. The next morning I went to the stable intending to take down the burner and clean it before starting, but I found that our trouble had been caused by mud, thrown apparently by the wheels into the netting under the burner, where it had baked, choking up the netting and stopping the draft. A stiff wire brush removed the baked mud and the difficulty, and we had plenty of steam that day; when but a few miles out of Troy we overtook a machine just like mine, except for the maker's name, and we lost two or three hours helping its owner out of several troubles in which he seemed hopelessly involved.

On the return part of this trip I broke a water glass, and after replacing it, refilling the boiler and firing up, I had trouble with those wonderful check valves, which closed promptly when the glass broke, but were thereafter disposed to close regardless of the condition of the

glass, and I had considerable trouble in locating the exact level of the water in the boiler in consequence. At Kingston, next morning, I took those check valves out of the cases and threw them away. Then I knew the passages between the boiler and the glass were free—had to blow the boiler off anyway, if a glass broke, and the only difference was the danger of spoiling the varnish on the wagon body with the hot water from a broken glass. The next day everything went lovely as could be desired, but in the afternoon of the second day I noticed that the water in the glass responded very sluggishly to the motion of the carriage, and finally became almost stationary—an infallible sign of stoppage somewhere. I stopped, blew off the boiler, took out the water glass and found a piece had broken off the bottom end and dropped down, practically closing the bottom opening, while a portion of the rubber gasket had worked over the top end and closed that opening, too. A new glass was put in, and then it was necessary to raise the back wheels and turn them by hand to pump the boiler full. The "Books of Instruction" tell you that the boiler will fill by gravity in from 10 to 15 minutes, but from my experience I should say that by gravity alone, 10 to 15 years would be more nearly correct.

This time when I got home I put a small globe valve in each connection, and now I don't have to blow off my boiler if a glass breaks, neither do I have "safety" checks seating themselves at the wrong time.

A bad feature about these water glasses is that they are located too far from the boiler, and the long connections add to the angularity of the water level on grades, and should be taken into consideration when running low in water. They also have a peculiar effect when the boiler foams; the reverse of what is usual on ordinary boilers. The glass and the long bottom connection contain water which does not participate in the foaming, and the water in the boiler being less dense while foaming, that in the glass and connection rush partly back into the boiler, at such times, and what is left in the glass is solid in appearance. In touring where many different kinds of water are used during the day, the boiler should be blown off every night if foaming is to be avoided.

On another trip of about 400 miles, I had a great deal of trouble with the boiler foaming one day. It was so bad that I stopped two or three times to blow off the boiler, syphoning it full of fresh water and firing up again, only to have it act worse, if possible. I was puzzled, until I discovered that my companion, after washing his hands, had put

the soap, usually carried in the tool box, on top of the tank, where the heat, the moisture and the slopping from the tank when full, had softened it, and it had worked into the tank through a vacant bolt hole on top, and perhaps past the cover of the filling hole. The soap was removed from that place, the top of the tank carefully cleaned, and after one more blowing off and a fresh tank of water, my trouble ceased.

On one of my trips, the joint under the steam chest cover blew out —it was only rubber and couldn't be guaranteed for any length of time at high pressure.

On another trip the joints blew out of both cylinder heads, and, although I was assured at the factory that these were ground joints, on taking off the covers I found remains of some sort of joint, I couldn't tell what, which I carefully scraped off and replaced with common brown wrapping paper and boiled oil. Another time I had just got up steam when I noticed that the throttle lever, which I knew was in the closed position when I started the fire, was now in an open position, and upon taking hold of it found it was free from the valve. Upon investigation, I found the stem broken in the thread; it was very light and of the poorest brass, and scarcely any metal was left to hold it together where the thread was cut.

The chain is one part of the machine which requires careful attention, especially on a tour; and it is surprising how much "stretch" will develop and in how short a time. All bicycle rules for chain adjustment fail to fit the case of a 'bile. I tighten my chain until it is almost rigid—the weight of two persons will depress the springs enough to give it all necessary slack. If left slack when the carriage is empty, the load is quite certain to add enough more by the depression of the springs to make it a possible source of danger. There is little likelihood of trouble while using steam and the chain is under tension, but when running shut off, as down a hill, it will get swaying from side to side if loose, and as there is a constant change of length, due to the motion of the body on the springs, it only requires the proper combination of sway and depression to cause the chain to mount the sprocket—then there's trouble. It happened with me on a tour, before I had learned to tell by the sound, when running, that the chain was getting slack. Fortunately, I was down the hill and moving quite slowly on the level, for the chain jammed between the sprocket wheel and the frame strut which encircles the compensating gear. It stopped the wheels instantly, and had our speed been greater would have been far from beneficial to the tires, to say nothing of the chances of my companion and myself taking a header.

A very simple improvement would be to have the brake so arranged that it could be fastened when applied, when desirable to do so. This would be a safeguard against running away when the carriage is left standing alone, and would be a great convenience when the operator has occasion to stop on some steep hill, and has no companion to hold the brake while he dismounts.

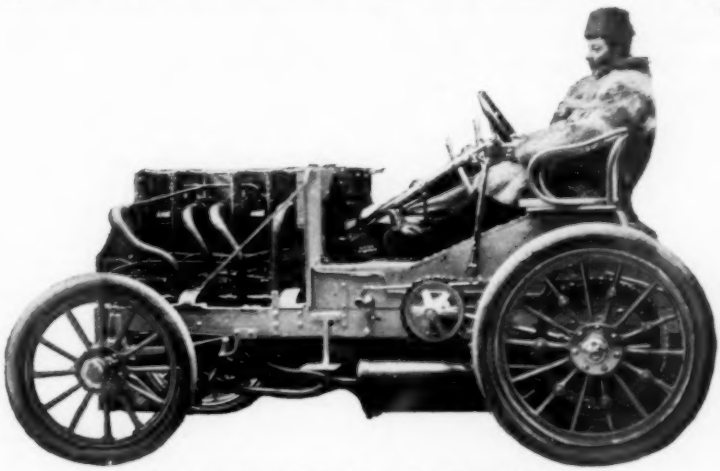
There are some very gratifying things about traveling in a 'bile, to one who has ridden a bicycle for years and has, not so long ago either, encountered some of the rural prejudice against that "silent steed." One thing is, that the road-hog who maneuvres his team so as to crowd you into the gutter with your bike, gives you room to spare when he meets you in your 'bile. Another is the friendly feeling manifested everywhere I have been with my machine by all classes of people. The farmer, who used to cuss the bike and its rider, now says when he meets the 'bile, "Great things, ain't they? Guess I'll have to get one some day. Never mind these old hosses, I'll take care of them—they've got to get used to them machines, and they may as well begin now." At any suspicion of trouble, willing ones are numerous and prompt in their offers of assistance. Caught unexpectedly by nightfall, on one occasion, with no oil in the side lamps, I stopped at a country store to get them filled. The proprietor filled them for me himself, and in doing so ran them over and wasted three times the oil that went into the lamps; but when it came to compensation, I had to force it upon him.

As I said before, I've run my machine over 2,500 miles during the past season, and I haven't caused a runaway—not one. I must plead guilty to "letting her out" once in a while, and have covered ground at a lively rate sometimes, on good road, but the sight of a horse coming, or standing beside the road is a sign for me to slow up, and I never pass one until I see that it is not going to give its driver trouble, and if a horse is disposed to act badly, I find that the best course is to stop my machine and insist upon having the horse driven past. I haven't much faith in horses anyway, and I don't care to do anything which is likely to aggravate the non-'bile public, and lead to annoying restrictive legislation against the coming vehicle.

A French Racing Car

THERE seems to be every indication that this spring and summer will witness the importation into this country of a number of foreign built racing machines. Every little while one reads in his daily newspaper that some well known American automobolist has just ordered from some European builder, a special car which it is expected will be much faster than any other vehicle ever built.

It is not the purpose of this article to go into the causes for the apparent favor with which American automobile enthusiasts look upon



Darracq Racing Carriage. 80 Horse-Power

French racing cars. That it does exist is evident. Perhaps it is because the American manufacturer is more practical and does not consider that the average person wants a fast vehicle, and therefore has not given it the thought and study accorded it on the other side of the Atlantic.

Be that as it may, there can be no doubt that France has produced some phenomenal machines so far as power and speed are concerned. For some time past rumors have been rampant to the effect that many builders over there have been engaged quietly in constructing powerful machines, and in this connection it gives us pleasure to

present an illustration of the Darracq racing car, the photograph for which was taken specially for the AUTOMOBILE MAGAZINE at the company's works at Suresnes, near Versailles.

The carriage is fitted with an 80 horse-power motor and has been built to take part in the great race of 1901, between Paris and Berlin. It is claimed to be the most powerful and fastest machine actually in Paris. There are four cylinders. The machine is fitted with both tube and electric ignition. Lubrication is accomplished from a central box which is seen at the front of the mechanician's seat.

It will be noticed that the driver brakes with both feet, and his position in the seat admits of the application of great power to the brake. The arrangement of sprocket drive is similar to the Panhard and other French machines. The spokes of the rear wheels are reinforced where the rear sprocket is bolted to them, and are fitted with 5″ Michelin tires, while the front wheels have 3″ tires of the same make.

A Few Dont's

DON'T light a match to see if your gasoline tank is full or empty. A friend who did so is minus a $1,200 machine—he expects to be out of the hospital next month.

Don't hunt for a leak with a match or any kind of a light except an incandescent lamp. Even then it's safer to let the other fellow do the hunting. Shut off all the valves you can find and wait till morning.

Don't smoke a cigar or pipe when filling your tanks or when around them in any way. The servant girl and the kerosene can furnish material enough for the paragraphers.

Don't bother with your machine, except to clean it, as long as it is working well. Continued "fixin'" when it didn't need it has ruined many a good machine.

Don't race on the public roads. You may get beaten, thrown out or arrested—possibly all three, and either one is bad enough. It's against the law, and it brings discredit on automobiles in general.

The Man with the Mileage

Bowed by the weight of "centuries" he leans
Across the tiller wheel and gazes on the ground.
His is the emptiness of the mileage face;
His back might bear the burden of the world.
Who made him dead to heedfulness and caution,
A thing that looks not and never cares,
Stolid and stunning, a brother to the trolley car?
Who slanted down those gleaming controlling bars?
Whose breath blew out the light within that lamp?
Is this the thing the vehicle maker gave
To have dominion over street and boulevard,
To trace the paths and search the suburbs for a road,
To feel the joy of swift locomotion?
Is this the dream dreamed by the maker of the machine,
Who stiffened that strong running frame of steel?
Down all the stretch of road to the road-house
There is no shape more terrible than this—
More tongued with censure of the world's pedestrians,
More filled with signs and portents for the passer by,
More fraught with menace to the universe.
What gulfs between him and Apollo Belvedere!
Slave of the tire of rubber, what to him
Are rules of parks and swing of coppers' clubs,
What the long reaches of the law's strong arm,
The broken leg, the reddening nose?
Through this dread shape the scorching age looks down,
Fast time's tragedy is in that steersman's stoop.
Through this dread shape, humanity betrayed,
Twisted, bent over and all humped,
Cries protest to makers of the motor,
A protest that is also prophecy.
O, manufacturers, dealers in all lands!
Is this the chromo that you give the world,
This monstrous thing, distorted and awry?
How will you ever straighten up this shape,
Give back the proud and upward-looking head,
Make right the awful sinuosity,
The parabolic incurvation, deflection serpentine?
How will the future reckon with this man?
How answer this brute question in that hour
When he is bent just like a boomerang?
How will it be with makers of the motored one,
With those who turned him to the thing he is,
When this bent terror tries to straighten up,
After he has reeled off all his centuries? —*Motor World.*

The Roads of Our Country

THE following extracts, taken from an address delivered by Honorable Martin Dodge, at the Good Roads Convention, held at Denver, October 29, 1900, may prove of interest to automobilists. Mr. Dodge is Director of the Office of Public Road Inquiries, United States Department of Agriculture.

The author has, for many years past, made a thorough and exhaustive study of the question, and anything he may have to say on the subject we may be assured is reliable. He is in entire sympathy with the movement for the improvement and better maintenance of our highways.

To those who may be interested in roads connecting centers of population, between which the transportation of freight by self-propelled vehicles may be carried on, his remarks ought to prove of value. We quote :

" In the early history of the Republic, the Government of the United States undertook to build and maintain national roads. It was the thought and expectation of the early statesmen, that a system at least as universal as the railroad system now prevailing, should be built and maintained by the general Government out of the common funds of the general revenue. But that policy was abandoned about two generations ago, mainly because the railroad system was found to be a much better and much cheaper method than could ever be obtained by improvement under the ancient system. As a consequence of this change in the Government policy the construction of the common highways was turned over, first, to the States ; also, the national road which was built by the Government before that time, was turned over to the various States in which it lay, and by the States it was again turned over to the counties ; also, the policy of each State soon resulted in turning over to the localities the entire jurisdiction of completing the highway system.

" It is very remarkable that the cost of transportation over the highway is at the present time almost as great as it was two generations ago, and yet in reference to all the other means of transportation there has been such an unexpected increase in the facilities that it is really marvelous that we are able to have our transportation so rapid and so cheap. It may be interesting to you to know that it costs 25

cents per ton mile for moving freight by animal power over the common roads, while it costs only about one-half a cent a mile for moving the same amount over the better system, which is so commonly used all over the country, and wherein the inanimate power is substituted for the animal power that was so universal. You will notice that in the matter of ratio it is fifty to one. In other words, it costs as much to transport a product one mile by the ordinary system of animal power, as it costs to transport it fifty miles by the prevailing system in this country. That may not be exactly correct, but it would be approximately so."

In another part of his able paper, Mr. Dodge refers to the liberal manner in which the Government has contributed to the River and Harbor Commission, looking to the deepening of water in rivers and harbors, arguing from this that the Government ought to support in a much more liberal manner than it does, the improvement and maintenance of its highways.

The paper is replete with points of interest, and refers to the growing popularity of the automobile as another reason for a more aggressive and liberal policy on the part of the Government.

O ! Thou most faithful of brutes
And beast of burden,
Thou friend of women and children,
Victim of the summer fly
And divers other annoyances
Which made
Thy use an uncertain quantity,
It now doth look
As if thy days of service
Approached their close.
For I ! The horseless vehicle,
The herald of the "horseless age,"
Will put thee out of business.
Man may love thee well,
But t'would seem as though
He loves me better.

International Automobile Exhibition at Agricultural Hall, London

THERE cannot be any doubt that the interest in automobilism is world wide. American vehicles are seen upon European streets, European wagons are popular in the United States. This being so, the International Exhibition of Motor Cars to be held in Agricultural Hall, London, from May 4 to 11, of the present year, ought to draw from all corners of the earth.

This great show is to be held under the auspices of the Automobile Club of Great Britain and Ireland. The hall selected is the largest in the United Kingdom. So far all the space on the ground floor has been taken, and for the first time exhibitors will be compelled to use the gallery.

The demonstrating arena, in which hundreds of vehicles can be accommodated, will be used for showing the speed and reliability of cars, and also provide inventors and drivers an opportunity of showing their skill in steering. Altogether considerably more than a thousand machines will be on view. On previous occasions the presence of exhibitors from the United States has been a feature, and again there is extended a hearty welcome to all interested in automobilism on this side of the Atlantic. All visitors from the States will have personal attention, and whether they go as exhibitors or sightseers, they will be interested and instructed. The entries already received justify the statement that the exhibition will be the most representative display of motor vehicles ever seen.

Mr. Cordingley, who organized the first automobile show held in Great Britain, is to have charge, and that is saying enough. It is to be hoped that the American exhibits will be larger than ever before.

An Irishman was driving an automobile puffing laboriously up a steep grade when a passer-by hailed him and shouted that the brake was on; but the driver, with an accent of contempt for such ignorance, replied: "Begorra, can't you understand that? 'Tis to keep the machine from going back down the hill!"

(We desire those interested in both the manufacture and operation of Automobiles to send in for use, in this department, whatever they think may be of interest to us or our readers.—EDITORS.)

Automobiles on the Installment Plan

NOW that the automobile business has practically passed through some of its most trying seasons, demonstrating to the general public that it is stable, and as an oft-repeated expression puts it, has "come to stay," why is it not an opportune time for capitalists and manufacturers to turn undivided attention to its development?

As a matter of fact there are not many men earning, say from three to five thousand dollars per year, who unhesitatingly feel like paying out all the way from seven to fifteen hundred dollars at one time for a motor vehicle. This being so, it would seem as though immense business is assured to any company with wise directors and businesslike methods which can place on the market good, reliable vehicles, to be paid for in regular installments, say within a period of three or four years.

If it was possible to market sewing machines, pianos and other commodities in this way, why should it not be feasible with automobiles? Upon inquiry it will be found that most of the articles referred to (sewing machines, pianos, etc.) are not sold direct, but on the installment plan, much as some people may be averse to that method of doing business.

Could such a plan be made to work satisfactorily, needless to say it would give a great impetus to trade.

WINCHESTER, MASS. ALFRED LAMSDON.

Know Your Gasoline

I BELIEVE much of the grief and disappointment with gasoline motors comes from the quality or condition of the gasoline at the time it is used. There is gasoline and gasoline. Some will give excellent results, while other qualities will not work at all satisfactorily.

I find it pays to strain it while pouring into tanks, by putting a piece of cheese-cloth over the funnel. You will usually find quite a little dirt or sediment on the cloth which is less harmful there than in the carbureter or motor.

Then I carry a hydrometer in my tool kit just as much as a monkey wrench, and test every new lot of gasoline. The Winton Company recommend 76 for summer and 86 for winter use. Get whatever the maker of your machine suggests as being best, then the fault, if any, isn't on your side. Then sometimes water gets in your tanks or cans and it doesn't work well in the cylinder or the burner either. When you are out on a trip, of course, you usually have to take whatever you can get, but, even then, it's well to know what you are getting, and act accordingly. I believe the more a man knows of his machine —as of his horse—the better service he will obtain. J. R. F.

ST. GEORGE, S. I.

The Factor of Certainty of The Horseless Vehicle---Automobiles for Summer Hotels

HOW often do we hear prospective purchasers complaining of the uncertainty of the automobile. They would not hesitate to buy a vehicle, if they could only feel sure that they would not break down when out on the road, and cause a good deal of inconvenience thereby.

I am reminded of this subject by a statement made to me recently. It was made by a friend who owns and operates a gasoline motor. I say operate, because I happen to know that, if there is one man who is "getting his money's worth" out of an automobile, it is my friend. He is, in every sense of the word, a user. You know what I mean, one of those fellows who get their machine out on the street instead of keeping it in the barn "where moth and rust doth corrupt,"

and, "thieves sometimes break through and steal." That's the way a good many of us treated the old wheel; kept it down the cellar for weeks at a time.

Well, to get back to the subject. This friend told me the other day that he had within the past few weeks made seven trips to a certain point 44 miles distant, and returned, and that in making that number of trips he was delayed but twice and that for a very short time.

Now, it looks to me as though that machine was pretty "certain" as compared with a horse. The vehicle used was not of special make, but a stock carriage. Personally, I think many remarks made as to the unreliability of the automobile to "get there" are mere twaddle, for, as a matter of fact, when you come right down to it, there is perhaps as great uncertainty surrounding the horse vehicle as the horseless, to say nothing of the other advantages possessed by the latter.

Being situated up here in a section of the country which is frequented by large numbers of summer visitors, people who leave the cities in order to spend some time in the mountains which abound here, it has often occurred to me that the automobile could be used to advantage by the proprietors of our summer hotels.

In most cases these hotels employ 'buses or wagonettes which meet the in-coming and out-going trains, and convey passengers and baggage to and from the hotel. If, instead of horses, automobiles were used, it would mean a saving of time, as it would not be necessary to "hitch up" at all.

The automobiles, when not used for carrying guests to or from boats or trains, could be used to take parties out to see the various places of interest in the neighborhood.

JOEL SMITH.

POUGHKEEPSIE, N. Y.

Should the Motor Be in Front? The Question of Lightness

WHY is it that so many of our American automobile builders seem to fail to recognize the advantages of having the engine placed in front? That, it seems to me, is the proper place for it to occupy. Some may object to the long drive, either belt, rope or chain, which such an arrangement would necessitate, but that, it does

not seem to me, would make sufficient difference in general efficiency of any carriage to justify sticking to the idea of putting the motor in the body of the carriage, as is so common.

It cannot be denied that when it comes to getting at the mechanism, the placing of the engine in front offers exceptional facilities. This is a point which is worth thinking about, for while some owners are in a position to hire men to do that part of the work for them, many of us are compelled to do much of it with our own hands.

Then again, if the motor be placed in front, if any air is about at all it is more likely to get it than if placed in the body or at rear. I am not here advocating any pet form of motor, but merely what position it should occupy on the carriage. It does seem to me that if there is any choice in the matter at all, it should be in favor of the front end.

There may be good reasons, however, for not putting the motor in front. If so, it is hoped some reader will state them. No one of us knows it all, and I shall hope this short letter may call out some interesting points on the subject.

The question of the weight of automobiles is one which is constantly coming up. There is great difference of opinion as to the happy medium in this connection. Unquestionably some vehicles are built so heavy as to be altogether out of proportion to the work for which they are intended. My observation leads me to believe that this matter of weight is somewhat of a fad with a good many.

I heard lately of an eminent French automobile engineer who had devised a scheme which was calculated to be, and was in fact, quite a desirable improvement, and applicable to any gasoline motor. It had, however, the serious drawback of increasing the total weight by about fifty pounds. That fact killed the probability of his device being taken up with any degree of enthusiasm. If he had invented something which would have reduced the total weight fifty pounds, the public would have, to use a familiar phrase, "fallen over themselves in order to obtain it."

This great tendency on the part of people to reduce weight was characteristic of the bicycle. The weight was gradually reduced until almost absurd. People seemed to consider that they did not own a wheel worthy of the name unless it weighed less than twenty pounds or so. Since those days a reaction has taken place, and gradually the heavier wheel is coming into use again.

This is probably true to some extent of the automobile. Lightness seems to be desired particularly. There is no objection to this, of course, but when undue emphasis is placed upon it, then it is wrong, and manufacturers would do well, and users also, other things being equal, not to place too much importance on this matter.

SEATTLE, WASH. NED GALLIDAY.

The following paragraph is taken from a recent number of the *Pall Mall Gazette:*

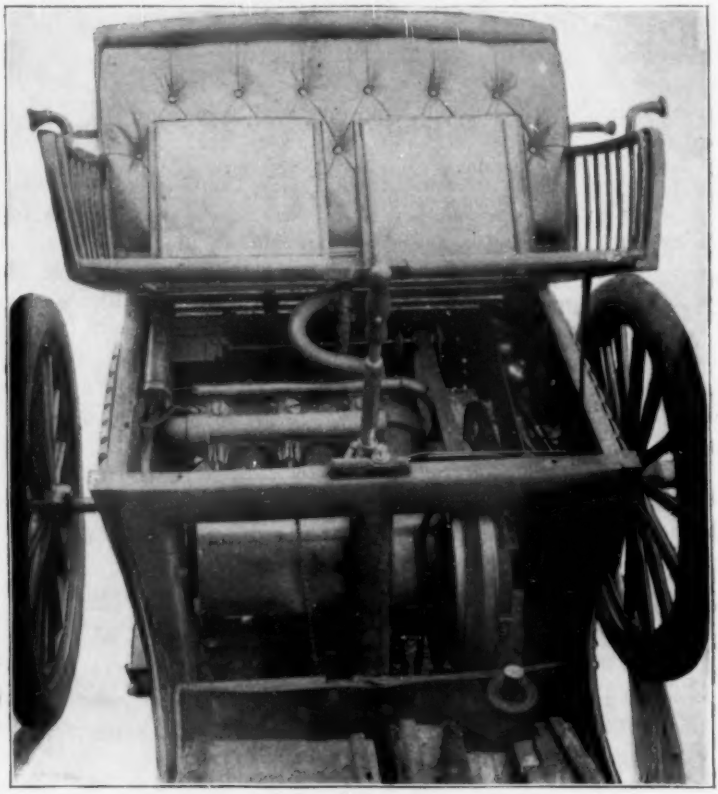
"It was stated at Bow Street Police Court yesterday that a motor car driven by a drunken man, was careening madly through the Strand the other day, swerving from side to side of the street, at the rate of from twelve to fifteen miles an hour. The constable had no difficulty apparently in arresting the mad thing, and there seem to have been no accidents. *It is incredible.* Fifteen miles an hour is about the rate at which a fire engine dashes through the streets. Now, supposing the engine, which is incredible, of course, to be driven by a drunken man, and to take up the whole breadth of the street, how in the world could a constable arrest its progress, and in what way could what the Yankees call an 'eternal smash' be averted? Without calling into question the arithmetical attainments of the policeman who arrested the motor car, we should like to know how he calculated the speed at which it was traveling."

Here we have another sample of the mistakes often made by officers of the law. It is true the blunder was made by a London policeman, but human nature is pretty much the same all over the world, and such a mistake is not beyond some of our American policemen.

The Post Office Department has decided upon the design for stamps to be used during 1901 in commemoration of the Pan American Exposition at Buffalo. It is interesting to note that one design shows a motor vehicle among the various means of transportation.

Mechanism of the Duryea Motor Vehicle

THERE are few names which are more synonymous with automobile development than that of Charles E. Duryea. In 1896, it was his gasoline vehicle which won the race organized by the *Cosmopolitan Magazine*. The course on that occasion was be-



Mechanism of the Duryea Vehicle

tween New York City Hall and Tarrytown-on-the-Hudson. Ever since 1891 Charles E. Duryea has been engaged in the manufacture of motor vehicles.

Knowing this, it gives us pleasure to present to our readers some facts concerning the mechanism of the machines manufactured

by the Duryea Power Company, of Reading, Pa. We recognize that as the public become more educated to the automobile, naturally more interest will be centered in the wheels which "go 'round." The illustration accompanying this article shows the entire mechanism, with the exception of the mixer, which is below and behind the central post of the seat, and the muffler, which is below and behind the motor. The motor occupies the major portion of the body and consists of triple cylinders, fed by a single fuel pipe leading from the mixer. The fuel tank is under the floor and the filling opening may be seen at the rear left hand corner. The exhaust chamber, like the fuel pipe, lies across the top of the motor and delivers the gases to the muffler through a pipe near the right hand side of the body. The exhaust valves and sparkers are on top of the motor, operated by a cam shaft inside the crank case ; the cam gears being visible near the side of the body. The crank case cover is quickly removable, exposing the cranks, bearings, pistons and other parts. The hill-climbing gear is on the left side of the fly-wheel, occupying but a space of about four inches between the fly-wheel and the driving sprocket. The large self-oiling chain connects this sprocket with a 15-inch one on the rear axle, in which the brake is placed. These large sprockets insure long life to the driving parts. There is no countershaft and no gears are run at ordinary speeds. The speed of the carriage is varied by throttling the motor, much as a steam engine is throttled. This throttling effect is secured by twisting the controlling handle, while raising or lowering same sets the clutches by means of a lever passing from the fly-wheel near the forward edge of the body. The brake pedal may be seen at the front of the floor, just between the panels which have been removed from the front of the body. A reverse pedal is at the rear of the floor. The water tank connections are apparent, and the seat is provided with removable panels, which permit inspection of either side separately and without raising the seat if preferred. While this arrangement gives complete accessibility and any part may be removed in ten to twenty minutes, further accessibility may be had by removing the side panels or a rear panel.

By this arrangement nothing around the mechanism is difficult to get at and yet when the parts are in place a neat looking American carriage-like effect is secured, without any odor rising from the motor in front of the operator and without danger of getting oil on the finest clothing. The feature of ease of control by either hand of either rider is also an important point.

Foraging for Fuel

By I. B. RICH.

DEACON EBENEZER BARTON had been known for years in the town of Weston as an uncompromising conservative in all matters, religious and secular. He lived about a mile out of the town, but never was there weather severe enough to keep him from the meeting house on Sundays and prayer meeting nights—and some of the unregenerates used to say, "It was easy tellin' Deacon Ebenezer was a Baptis' 'cos he never carried an umberel in any weather."

Now, Ebenezer had taken to himself a second spouse in the days when bicycles began to be in vogue, and though she hadn't "drove him distracted" by wanting one—or at least saying that she did—one of her pretty nieces was an early devotee and pretty nearly made the deacon forget all his words of piety.

Being a forceful man and a leader in the learned councils of the aforesaid town he forced his ideas against the new-fangled machines as far as possible and actually passed an ordinance prohibiting the peaceful tourist from wending his way through the town awheel on the Sabbath day. Some of the latter-day wheelmen will probably scan this with doubting eyes, but there are many who remember this form of persecution when wheeling out from staid old Boston, say sixteen years ago.

And the deacon hadn't grown liberal to any alarming extent in spite of the numerous pilgrimages which the many admirers of his niece made awheel to the Barton abode. He tolerated them now, however, really couldn't help it, with the rapid multiplication of their numbers, and his Sunday anti-riding law soon became a thing of the past.

It was this same Deacon Ebenezer who stood aghast in the meeting house yard on a fine Sunday afternoon to see a carriage go flying past and not a horse in sight. No sight of anything but a faint trail of steam out behind in rather a ghostly fashion.

"Well, I snum, Marthy, what'll they be doing next. Must be one of them automobily kerridges I've read about in the *Ploughman*. Bisikls was bad enough, scarin hosses and raisin' ractions generally, but this is wuss. Chasing round the country when they otter be home or at church. Now I draw the line at these kerridges, and I won't

have none of them hanging round our place nohow. 'Twas a reglar bisikl headquarters when Edith was with us, but if Louise has anything to do with any automobily fellers there'll be trouble." Louise was a younger sister who was now stopping with them.

* * * *

Mr. Joseph Walker was a live young man of Wayland—next town to Weston—and about as full of pranks as a college boy can be. He hadn't any specially bad habits, but when there was any fun going around he usually had his share. His chum, Harry Wilkins, was visiting him, and had brought his new Winton with him.

"She's a bird, Harry," exclaimed Joe, as they went rolling along, "wish I had one like it. Must get the Governor interested. 'Praps he'll get one then. Ever have any trouble getting gasoline when you are out on a trip?"

"Never have yet. Don't know what the deuce I'd do if I did. Lay up 'till I could get some I suppose—don't know where—what town is this anyway, Joe, mighty pretty road this."

"This is Weston, Harry, and we are on the back road—used to ride this way on my wheel to see old Deacon Ebenezer's niece. Mighty pretty girl was Edith, too, other fellow got her though. Her sister Louise isn't half bad either, may see her if she happens to be out of doors."

"Any law about stopping, hate to see a girl on the fly, Harry."

"No law, exactly, but a whole heap of gospel in this case. Deacon Ebenezer is plum full of Baptist, and if we stopped to-day with this thing I'd never get within gunshot of Louise, if he could help it. If you'd lived in the next town to the Deacon a few years ago, you'd know more of the Deacon. Worst anti-bicycle crank in the eastern part of Massachusetts. He's a terror from Terrorville. 'New fangled contrivances for people too lazy to walk,' as he puts it. Oh, no, Harry, my boy, we don't stop at the Deacon's to-day—Sunday—may be safe to-morrow, but not to-day, nixie!"

They hadn't gone very far, however, before the carriage began to slow down, and stopped before they knew it. Joe looked at Harry, and Harry returned the compliment with interest.

"What's the matter with your old trap, anything wrong?"

"Give it up, Joe, just seemed to make up its mind to stop. Let's look around and see what's up. Everything looks all right. Did you fill that gasoline tank? No? Well I didn't either, and thought I asked you to; just look in that cubby for that spare can of gasoline.

Empty eh? That's a nice pickle. Now what are we going to do anyhow?"

"Jiggered if I know, Harry. Might just as well be in the desert of Sahara, except that we can walk home. Nearest house is Deacon Ebenezer's, I just told you about. Might just as well apply to St. Peter for admittance to the golden gate as to tackle him for gasoline for one of these 'gol-darn thrashing machines,' as he calls 'em—Sunday, too. Well I guess that we better call the Deacon's off and think of some other scheme. If the old thing only used hard cider, or even whisky, we might get a little, for I believe he does keep a jug handy, but gasoline, never."

"Well, if the Deacon's is the only place around here, then the Deacon has got to give down on the gasoline, Sunday or no Sunday. 'Twont do for you to go, and besides I want to see that pretty niece. Louise, did you say? Rather like that name. Now, Joe, you stay here out of sight. If you see anyone coming back with me you groan and hang on to your knee, keep mum as you can, but call me Doctor, if you have to speak. Now be a good boy and I'll try not to stay too long with Louise."

"Groan—hang on to my knee—call you Doc! What the deuce are you going to do, anyhow, Harry?"

"Going to get some gasoline, now remember," and he walked off carrying the spare can.

It wasn't far to the Deacon's, just up over the hill, but the elm trees that lined the road completely hid the carriage from view. Harry walked up the road and turned into the dooryard just in time to discover a very pretty girl about to enter the house.

"Pardon, but is this Miss Louise? I thought so from the descriptions I have heard. Can you inform me if the Deacon, your uncle I mean, has a supply of alcohol on hand? A queer thing to ask, isn't it, but the case is this:

"A friend and I were out riding along the road, over the hill a piece, when we had a slight accident. Nothing serious, I assure you, but as a physician I must look out for future complications, and so I come to you for a little assistance."

"Yes, of course, but the alcohol, how much will you need?"

"About a gallon, Miss. The new ideas in medicine use it freely in cases of this kind."

"Be you a Doctor? Don't look like one seems to me, but they're turning out some funny ones now days," was the cheerful welcome of

the Deacon himself, who had come upon the scene just in time to hear the last remark. "What is it you want anyhow?"

"He wants some alcohol Uncle, friend of his hurt his knee in an accident, wants to try a new method of treatment, needs about a gallon he says. We haven't got a gallon, have we, Uncle?"

"Gallon of alcohol? Guess not. Costs too much to keep. Might have a pint, but that's all. Anything else do, Doctor whatsyername? Never want a man to come to me for help and go away with an empty can. How'd cider do, even if 'tis Sunday and most time for afternoon service?"

"No, cider won't do," said the Doctor pro-tem, as he seemed to be thinking deeply, "there's alcohol, oil of Bergundy and gasoline; haven't any oil of Bergundy, have you Deacon?"

"Nope, never heard of it. Guess we've got gasoline though. Take the Doctor's can and fill it with gasoline, Louise, that's a good girl, and then we must get ready for meetin."

* * * *

Armed with the needed fuel Harry wended his way back to the carriage where Joe was waiting and proceeded to fill his tank without delay.

"How the deuce'd you get it? wasn't the Deacon home? see Louise? 'dye tell them what you wanted it for?" were a few of the questions fired at Harry as they prepared to start again. But the only reply was: "Got the gasoline, didn't I? Isn't that enough?"

"Now we're off Josie, my boy, and you'd better lie low as we pass the Deacon's. I don't want to give the snap away, may have to work it again some time," and the way the Winton was pushed by the Deacon's was a caution.

* * * *

The next day Joe happened in the Weston store as the Deacon came in with his gasoline can.

"Give me five gallons more gasoline, Jim, and put a padlock on it, too. I'm getting to dern green fer anything in my old age."

"What's the matter, Deacon?"

"Wal I'll tell yer. 'Bout a week ago a chap comes to my house and says his automobeely is stuck down the road, wants gasoline to get home with. Wal I don't have no spechul use for them things no more'n I had for bisycles, ez you may kno, an I told him to go to blazes and walk home. Sassed me back some, and off he went.

"Purty soon another feller came along with an officious lookin'

cap on and a bright new can, and walks up, and, sez he, 'Do you keep gasoline on the premises?' sez he. Yes, I sez, and I'm going to keep it, too, none of them fellers with 'choo-choo' threshing machines going to get it, either.

"'Well,' sez he, 'thout seemin to notis my remarks, 'as you're insured in the Northern Liberties Insurance Company (I wondered how he knew, clean forgot that coffin plate of theirs wuz on the house) I must either test the gasoline you're using or revoke your policy. There's so much poor gasoline being sold that we have to be very careful.'

"With that he pulls out a funny kind of thermometer and handed me the can. 'Fill it full,' sez he, 'for a thoro test.' Then he jammed the glass into it. 'Seventy-four and eighty-five hundredths,' sez he, 'a little below standard. Pretty near, but I'll have ter make a clost test in my labertory.'

"'Seein's I have to take it, I'll pay fer it,' sez he, and gives me a quarter.

"Wal, I was feelin' kinder shaky over that gasoline stove and the insurance policy, when I hearn a racket out in the road, and there comes one of them machines. Kinder slows up, and there's the two chaps as came to see me, the one I fired and the insurance inspector, who sings out: 'Yer gasoline's all right, Deacon, works fine, don't worry about your insurance policy.' Then they laffed, and I'd a swore if I hadn't been a Deacon.

"Wal yesterday, Sunday, mind yer, a spruce looking feller comes up with a can, same kind of one, too, and began talkin' to Louise 'bout an accident to his friend. Sprained knee, or sumthin' of the kind. Wanted a gallon of alcohol to treat it 'cording by a new idea. Course I hadn't any alcohol, knew that probably, then he wanted oil of Bergundy, or some such stuff, and finally said gasoline would do on a pinch. Sed he was a doctor, and I believed him.

"Wal, he got the gasoline, and 'twasn't long before another one of those travelin' saw-mills went flukin by—didn't stop fer nothin'. Now I ain't dead sure, but I think it was that doctor and his friend, looking pretty chipper fer a feller with a sprained knee though. If he had a asked for gasoline first off I'd a spicioned him I think, but when he seemed to take it in a kinder disappointed way I never thot of being fooled. But the next man that gets any gasoline from me fer anything, broken knees or episootic, he's got ter have a shot gun and get just aim."

Bridgeport's Automobile Club

THOSE members of the Automobile Club of America, and guests, who took the ride from New York to Bridgeport on December 15 last, will remember the royal way in which the automobile club of that city treated its visitors.

The Bridgeport club was first formed on September 13, 1900. Its second meeting was held September 24. It duly received its charter November 7.

The objects of the club are practically the same as those sought by similar organizations. Ever since its inception the club has been exceedingly aggressive. Its members are enthusiasts on automobiling in all its relations to social and business life. At present the number of members is twenty-six, and every one of these gentlemen own motor vehicles, of one kind or another, it being in fact a rule that no one shall be elected to membership who is not an owner or part owner of a self-propelled vehicle.

Up to a short time ago the efforts to establish an automobile repair station and storage room seemed to materialize slowly, but recent developments indicate that this will probably be attained by April 1. Machines can then be taken care of, and in connection with this, club rooms will be provided for members and visiting automobilists. These latter ought to be quite numerous. It is a beautiful ride along the Boston Post Road from New York, especially in the summer, and Bridgeport ought to become a favorite halting place.

In this connection it gives us pleasure to present our readers with illustrations of the officers of this vigorous exponent of automobilism.

The president, Jonathan Godfrey, is one of Bridgeport's leading manufacturers, and is president of the Compressed Paper Box Company. He is an ardent and intelligent automobilist, and one who has given the matter of automobile construction much earnest thought.

Vice-President Louis Cassier is shown seated in his machine, accompanied by Mrs. Cassier. Mr. Cassier was founder of the club, and during the past year has driven his automobile a great number of miles. He is publisher of *Cassier's Magazine*, of New York and London.

Frank W. Bolande, secretary, is also secretary of the Post Publishing Company and managing editor of the Bridgeport *Evening Post*. Mr. Bolande has done a great amount of driving, and is in entire sympathy with the interests of the club. His efforts in the cause are un-

1. Jonathan Godfrey, President
2. F. W. Bolande, Secretary
3. T. E. Griffin, Treasurer
Vice-President Louis Cassier and wife
4. Thomas P. Taylor, Chairman of Board of Governors

tiring. He uses his machine daily in going to and from his summer residence at Beachcroft, Long Hill.

The treasurer of the club is Mr. Thomas E. Griffin, who is assistant superintendent of the Locomobile Company of America, whose factory is in Bridgeport. Last year, at Chicago, Mr. Griffin covered a mile in 1:06, using a Locomobile racing vehicle. He has won a number of prizes for fast time, and is generally recognized as the cleverist operator in the city of Bridgeport.

Secretary F. W. Bolande and Wife

The Board of Governors consists of four gentlemen, Mr. Thomas P. Taylor being chairman. Mr. Taylor was formerly mayor of the city, and is a strong advocate of good permanent pavement, and we suppose good roads all over the land. He is a manufacturer, and is looked upon as one of the foremost public men in Bridgeport. He also is the owner of a Locomobile. Other members of the Board of

Governors are Dr. Charles C. Godfrey, who uses his automobile in his practice; George W. Hills, president of the Post Publishing Company, and John C. Spiers, superintendent of the Locomobile Company of America.

Although the club has been in existence but a short time, it hopes by enterprise and genuine merit to take a front rank. Judging by what has already been done, and the great interest evinced by its members, we predict a most successful season's work for this organization during the coming spring and summer.

Endurance Test on Long Island

THE endurance test, to be held under the auspices of the Long Island Automobile Club, and to which reference was made in our February number, will not be held until some time late in March. The following conditions have been laid down by the committee who have had charge of the arrangements.

The test will be open to three classes of machines—steam, gasoline, and electric, and special prizes will be awarded for each class. Should application for entrance of other motor powers be received they will be given due consideration.

The course is to be over macadamized roads on Long Island, and include grades and levels. One hundred miles must be covered within a 12-hour limit. The speed limit while passing through villages and towns is 8 miles, while the maximum speed must not exceed 15 miles per hour.

All contestants are to provide their own fuel and water, either by preliminary arrangement or transportation, while owners of electric vehicles are to make their own plans for battery relays. In the event of a tie between two carriages of the same type the best average time wins, taking into consideration the amount of fuel consumed, weight of carriage and number of stops.

Between Jamaica and Flushing a hill-climbing contest will take place, where there is an estimated grade of 20 per cent. one quarter of a mile long.

The test will be confined to self-propelled vehicles, so constructed as to carry not less than two passengers, side by side, and all vehicles must carry full complement of passengers. The entrance fee for each carriage is $10.00, and full information as well as applications should be made to Charles W. Spurr, Secretary Long Island Automobile Club, 552 State Street, Brooklyn.

The committee in charge of this endurance test is as follows: L. R. Adams, President of the club and Chairman of Contests and Exhibitions Committee; H. B. Fullerton, Chairman of Good Roads Committee; H. S. Chapin, Chairman of Runs and Tours Committee; F. W. Tousey, R. E. Jarrige and J. E. Savel, members of the Contests and Exhibitions Committee; F. G. Webb, Chairman of Technical Committee; C. W. Spurr, Robert Darling and A. R. Pardington.

Prospective Purchasers And Free Rides

THERE are always people who expect a great deal for nothing, and the growing popularity of the automobile has proved an excellent means for the man who wishes to see the country at little expense. Reference is here made to the "free ride" game put up by some of those looking for a machine, and sometimes by those who have but very little idea of buying. Of course it cannot be denied that when a person is called to invest several hundred dollars in a motor vehicle, he ought to have some kind of demonstration which will satisfy him that the machine will do what its makers claim it will. While this is so, it is also doubtless true that in a great many instances there are those who go almost "too far" in this matter, and it would not be at all surprising if there were some people who merely feigned to be probable purchasers in order to get the rides, which most manufacturers seem willing and glad to concede to prospective buyers.

Some of the makers over in England have checked this thing somewhat by making a proposition to those asking for rides. This proposition calls for the putting up of a certain small amount, enough to cover cost of operation while demonstrating, which is forfeited in case of non-purchase, but returned should a purchase follow. It certainly is no fun for a manufacturer to get a machine ready, place gasoline in it, subject the machine to so much extra wear and tear, run risks of puncturing tires, stand the loss caused by the time and service of operator, and then "demonstrate" for a hundred miles or two without any prospect whatever of selling a machine, either directly or indirectly, as a result of that trial. There can be no doubt whatever that this "game" is being worked to an excessive degree by some. Instances have been known where apparent purchasers have gone from one company to another, treated to long-distance rides, sometimes going into the hundreds of miles, and in the long run have not bought at all, deciding to wait until a more convenient season.

John's "Orter-mo-beel Cart"

"Dad burn my hide!" said old Bill Moore
As he lounged about the grocery store,
"I've laffed until I'm 'fraid I'll bust
So guess I'll tell erbout it fust.

"You know Joe Perkin's boy, John B.,
Who works in Wash'nton, D. C.?
Wal' he's come home from furrin parts
With one them orter-mo-beel carts!

"Th' durndest lookin' rig-majig,
Some like a hearse an' nigh as big.
Joe says, 'how much d'you pay, my boy,
Fur that air hors'les carridge toy?'

"John sorter smiled, an' looked real glad:
'It cost me fifteen hundred, dad.'
Th' ol' man gasped an' then he said:
'I guess you've got dam-phool-n-ther-head!

"'Now my ol' mare cost thirty-five,
She'll beat it, sure's you're alive.
You can't haul wood, ner mow, ner plough,
Ner do a thing with it, I vow!'

"Ol' Perkins looked th' durned thing through,
An' shook his head, said t'would'nt do.
Th' more he looked, th' more he scowled,
An' then he raved, an' cussed, an' growled.

"'An' injine in th' thing,' he said,
'I sh'd think t'would bust an' kill yer dead.
Big injy rubber wheels, I vum!
I shouldn't think t'would go ner come.

"'Now, look at them air cogs and chains,
An' iron rods instid o' reins!
To waste that money was a sin,
'Tain't wuth th' room to store it in!'

"John says, 'now, dad, bring out th' plow,
I'll show you what t'will do, right now;
Hitch on behind; when I say ready,
Hold the nose down good an' steady.'

"He started tearin' down th' field,
His dad hung on, he wouldn't yield.
Gee whiz! he made th' speed increase,
An' ploughed them furrers slicker'n grease.

"Then next he hauled a load o' wood,
Bigger'n my two horses could.
In fact, he proved it to us there
That he could beat his dad's ol' mare!

"'I'll give it up,' his ol' man said,
'In pullin' loads that thing's ahead;
It duz th' work so slick an' neat,
That on that pint I'll 'low I'm beat.

'But when it comes down to er race,
Yer durned ol thing takes second place.
I'll give yer forty rods th' start,
Then beat yer orter-mo-beel cart.'

"John laffed, and said, 'though that ain't bad,
I'd ruther start in even, dad.
Le's go to Barlow's store an' back,
As that's a sort o' circ'lar track.'

"They started out, jest side by side,
Each laffin' fit ter bust inside.
Th' ol' man started up th' mare,
An' John kept right beside him there.

"The ol' mare scooted like er dart,
So did th' orter-mo-beel cart!
I watched them from top th' shed,
Th' ol' mare couldn't git ahead.

"An' when they reached th' store down there,
John kep' beside his father's mare.
As they swung 'round on th' return,
Th' ol' mare switched that tail o' hern.

"She lit out then, like all possessed,
While John leaned back, as though to rest.
He yanked th' brake, it seemed ter me,
An' come like light'nin' down a tree!

"He left th' ol' mare up th' hill,
A lookin' s'though she's standin' still!
Gee whiz! how that machine did gain,
A comin' like a railroad train.

"When John got home he didn't stay—
The mare was half a mile away—
John turned his orter-mo-beel cart;
Back for his dad I seen him start.

"An' back they come, right side by side,
But John's ol' man had lost his pride.
He says, 'I guess it must have wings,
I'm goin' to buy *me* one them things!'"

LEWIS A. BROWNE.

Status of Electric Vehicles in France

MR. Hart O. Berg, of Paris, France, considers that the electric carriage in that country is pressing the petroleum vehicle hard, and will continue to do so. For some years past there has not been any over there who seemed inclined to take the risk of establishing central stations, which of course are necessary in cities where the electric automobile is to be much used. Recognizing this condition, and feeling sure that the electric carriage would appeal to the Parisians, the Electric Vehicle Company established a central station, which is equipped, not for the purpose of taking care of Columbia vehicles only, but all types of electrically propelled carriages. This growing popularity of electric machines is astonishing petroleum enthusiasts. Mr. Berg thinks, however, that not only will American-built electric vehicles be far superior to those built in Europe, but that American-built petroleum vehicles will occupy first place over those built in France.

I Make a Trial Run

BY R. E. MARKS

JONATHAN Gearcase is the son of a prosperous Boston truckman, and has mechanics on the brain. He took a course at the Boston Tech. and has a little shop of his own, where he tinkers at everything, from flying machines to automatic tack lifters. But he's a nice fellow, and I often drop in for a little chat and to see what he is working on.

When the auto fever began to develop he started to work on an engine, and got one of his father's heavy trucks to experiment with. He informed me very confidentially that he "was going to let the other fellows do the experimenting with the light carriages while he got in on the ground floor with the steam truck." So he pegged away, finally completed a new steam wagon and, like all inventors, he was enthusiastic to the last degree. Of course we knowing ones, who never invent anything, smile in a lofty way at this enthusiasm, but it's a good thing just the same. Half the really useful inventions wouldn't have been brought out without it.

Last Saturday I happened in to look it over, and found him particularly jubilant, for it was just completed and all ready for business.

"Got her done, Marks," he said, "and she's going out Monday. Say, wouldn't you like to go along with us on the trial trip. Going to take her to Worcester early Monday morning. What time? Why 3:30 A. M., sharp, so as to get out of the city before the teaming begins. Don't want to scare horses, you know. Bring your camera and be on hand early."

To go or not to go—that was the question. Whether to go and risk being held as a witness for runaways, and incidentally gain the desired experience in motor wagons, or to flunk and lie comfortably in bed until a decent hour for rising. Three-thirty A. M.—and November, too.

But I rose above thoughts of bodily discomfort, borrowed an extra alarm clock, and with one on each side of the bed—both set at 3 o'clock—I dropped asleep. In due time I awoke, and in a dazed sort of way pulled on my clothes and made my way to the barn. It was a cold, raw morning, and with an overcoat, mackintosh, umbrella, over-

shoes and camera I arrived precisely at the appointed time. Not a soul in sight. So I did the ghost dance till Jonathan arrived, fifteen minutes later.

"Isn't Bill here? I told him to come at three and get her all fired up, ready to start. Confound a man you can't depend on. I knew I was a little late, but—well if he didn't go home and leave that brake only partly done—no earthly use that way, and we won't have time to fix it. Guess the engine will hold her, anyway."

Slowly—how slowly no one knows who hasn't waited under similar circumstances—the clock hands crawled around to six, and still no Bill appeared. If I had only been as sensible and had my sleep out too.

For some reason Jonathan would not do a thing without Bill. Wouldn't start the fire or fix up anything, and I was on the point of bidding him a fond adieu, when Bill dawned on the scene, at 7 o'clock, sharp. "Forgot all about the trial, Mr. Gearcase, and came to work as usual. Now watch me hustle," and a fire was started in a hurry.

In the meantime nature had asserted herself, and the gnawing feeling from within had prompted Gearcase to go in search of a lunch, which soon proved to be rye bread, bologna sausages and cheese—a tempting breakfast on a cold morning. Finally, at 8 o'clock, four and a half hours after schedule time, we started. And what a start.

Cold cobblestones, iron tires and a wagon with a comparatively light load is a combination that beats the world for noise and jouncing, and we had all three. The two 4-inch gongs were an unnecessary expense, and must have been for ornament only, and for the amusement of the operator—neither could be heard ten feet away from the wagon, and then only as a different and minor noise, mingled in with the rest. The sausage and cheese vied with each other for supremacy as interior decorations for our anatomy, and altogether we were hardly comfortable to the point of luxury. But Gearcase smiled grimly and tried to be happy—for we were actually moving.

Horses shied, and housewives rushed to their windows to see what all the commotion was about. They had plenty of time to find out, between the noise which heralded our approach and the time it took us to get out of view, for we were now moving at the exhilarating speed of about three miles an hour. As we were to reach Worcester, forty-four miles away, by noon, it will be seen that we must have had plenty of power in reserve. Unfortunately that is where it staid—in reserve.

School children stopped to see the sight or hear the noise, I don't know which, and if ever anyone had longed to be away from the madding crowd and out on the country road, that was me. Questions were fired at us by the score, boys would come along with oil cup tops and other sundries we had dropped, and altogether we were more prominent than a modest man cares to be. The only redeeming feature was that I was a passenger, and not part of the show itself.

Cobbles, and even Belgian block paving, give one that tired feeling after awhile, and I longed for some of the famous sarsaparilla, as well as bromo-seltzer, to reduce my head to its normal size—it seemed to be riveted over from the jarring—probably crystallized—and was trying to stretch my hat. But we were nearing the outskirts of the Hub at last and better roads were in prospect.

It is needless to continue the tale. I had my fill of personal experience on a trial trip, and as the engine broke a crankpin getting out of Hyde Park, I made good my escape by trolley. It was then high noon. We had ridden, I can't say travelled, about eight miles in four long hours, and Worcester was still thirty-six miles away.

A trolley took me back to Boston in forty minutes, and I made up for lost time by going to bed and sleeping till Tuesday morning.

Gearcase called on me the next day to say they were ready to go ahead, and wanted me to see what they could do out on the road—but I had other business on hand, and I always shall have when there is anything of the kind going on again. Next time I get up at 3 o'clock to start out on a new motor truck just get me a padded cell in the nearest lunatic asylum.

The days of automobile advertising seem to have about passed. A few years ago quite a number of our leading dry goods stores purchased automobiles, not so much because they were cheaper to operate than horses, but because of the advertising it gave. At the present stage of the game, however, this advertising, in our large cities especially, is very small indeed. Advertising by means of an automobile may be all right for concerns that can stand it, but for the small advertiser it does not pay.

A 'Bus Line Experiment

By O. L. STEVENS

A LINE of electric automobile omnibuses has been doing business in the streets of Boston for a month, and the people have been showing a good deal of interest in them. This line was started on the afternoon of Sunday, December, 30, 1900, running from the upper part of the Back Bay residential district down through aristocratic Beacon Street, out through Arlington Street, thence around the Public Garden and the Common, through those parts of Boylston and Tremont Streets which are now devoid of street cars, to the point where Tremont street ends in a jumble of street car tracks and subway stations in Scollay Square, downtown. The omnibuses used were made-over wagonettes arranged to carry ten persons inside and two on the seat with the driver, and they were put into service by the New England Electric Vehicle Transportation Company as an experiment, to see whether there was enough demand for this kind of transportation to warrant the introduction of the largest and best vehicles available.

The first trip was made soon after 3 o'clock in the afternoon, and from then until about 8 o'clock, three 'buses were kept on the line. They carried about 175 passengers in the five hours, many people riding from curiosity; and the vehicles advertised themselves well, for each attracted a crowd wherever it stopped.

As reconstructed, the chief defects of the 'buses are too great a height from the ground and a narrowness which makes it somewhat of a feat for a person to move from a front seat to the door if the 'bus happens to be filled. Still, a sign posted inside gives notice to all users that if the line is seen to meet a popular demand, new and "more commodious" vehicles will be put on.

The following morning the line began operations on a regular schedule. Its first trip down town was run at 7:45 o'clock, and others followed through the day on what was meant to be a fifteen-minute arrangement. This was maintained pretty exactly, except that two or three times a trip was lost because the power gave out *en route* or because there was delay in replacing exhausted batteries at the terminus.

One trip, they say, was left out because a 'bus-crew forgot to get back from dinner at the right time, but things like that don't happen now.

As a matter of fact, the arrangements for recharging the 'buses were the worst thing about the whole line. There were six 'buses to start with, and in order to make a fifteen-minute schedule, four had to be on the route constantly. But every time a 'bus was recharged it had to be run from the up-town end of the line, across town to the company's central station in the South End, a round trip of two miles and a half entirely off the route. The route itself measured 4 miles 180 feet on the round trip. It was found that the original arrangement, that each 'bus should make three round trips and return to the central station on a single charge, was rather more than it was advisable to expect, and after the first day a 'bus went for new batteries after every second trip. This worked very well, and in the first week of operation there were surprisingly few cases where a 'bus was stranded on the route. It was evident that the reputation of the line would suffer if any attempt was made to run the batteries to the limit, and the 'bus crews took no chances.

A week of this kind of work was enough to show that the line would have to have a recharging station at its terminus, if it was to give satisfaction to the company as well as to patrons, and steps were at once taken to install the necessary sub-station near the Deerfield Street stopping place. This allowed an increase in the number of 'buses on the line, and the station will eventually be developed, in all probability, for use by all other electric rigs operated by the company, as the "Three Roads," so-called, near where it is located, is an important point in Boston carriage business.

But the line was regarded with considerable favor by people along the route. It filled a want. The Back Bay section which it served was practically without street car service to theatres, hotels, and the shopping district, and the new line of automobiles not only runs through the Back Bay district, but affords the only direct surface route through the lower part of Tremont Street.

It would be hard to find a route so short that offers more to attract business. To make the conditions still more favorable, since the street cars were taken off Tremont and Boylston Streets, much of the surface has been asphalted. Practically the whole of the route on Beacon Street is of asphalt, and the short stretch in Arlington Street is of Macadam and brick pavement, so that for all except a short sec-

tion of Boylston Street, the 'buses glide over a surface so smooth that there is none of the disagreeable jolting which shakes passengers into *dishabille* and bad temper at one and the same time.

For the first day or two the 'buses carried an average of ten or twelve passengers for each round trip. Later, perhaps the average was not more than eight, on some days. But the people kept riding, and Manager Neftel figured at the end of the first week that the line had carried on an average about seven hundred passengers a day. This was on the basis of a ten-cent fare, running the first trip just before 8 o'clock in the morning, and the last at about midnight. Business men rode down town in the morning and back at night on the 'buses, but it was intended to be primarily a "ladies' line," and from the first has been patronized largely by the gentler sex. They took to it with much curiosity and some signs of satisfaction for morning shopping trips, and the sociability of a forenoon ride down town on the 'bus line was something that had not seen its equal in Boston since the good old days when everybody who rode in a horse car knew everybody else in it.

The franchise for this line has had an interesting experience. It was asked for, with other routes, by the Boston Transit Company, the original automobile operating company in Boston, a company which was fathered by Colonel Albert A. Pope and incorporated with a capital of $100,000 before the Colonel had joined forces with the Electric Vehicle Company. This company petitioned for three routes through the city before the Board of Aldermen in February, 1899. The franchise was held up until after the people voted in December, 1899, to have the street car tracks taken up in Tremont and Boylston Streets, alongside the Common and Public Garden, and was then granted. In January, 1900, the company was reorganized, and the shifting of directors showed that it had been swallowed up in the Electric Vehicle Company's combination and had become a branch of the New England Sub-Company, which thereafter controlled its plans. With the street cars off Tremont and Boylston streets, the way seemed open for the running of omnibuses a year ago, but the company for months gave the excuse that no practicable vehicles could be obtained from the builders.

The final decision to start the line seems to have arisen from the fact that the company had the wagonettes on its hands without much call for them in business, and from the fact that the two horse cars which had been running in desultory fashion on one or two streets of

the Back Bay, without providing any through service to the down town shopping and theatre districts, were taken out of service permanently on Christmas Eve.

They said you wouldn't balk
Or plunge or rear;
Yet home I'll have to walk
And leave you here.
As gentle as a lamb,
They said you'd be;
As vicious as a ram
You've been to me.
They said you wouldn't shy
Or run away;
Yet here lie you and I,
Both wrecks, to-day.
They said you'd never try
To "take a fence:"
You took it on the fly
And moved it hence.
The horse's fastest gait
Was slow for you;
You had the ass' trait
Of meekness, too;
You were with ease controlled,
Or so they said;
Yet here but now I rolled
Out on my head.
Oh, once more let me feel
That I'm astride
The good old horse or wheel
I used to ride.
They never left me sore,
As here I'm seen,
Preserved, with bumps galore,
In gasoline.

—*Chicago Post.*

Of Passing Interest.

(*Readers will confer a favor upon the editors of this magazine by sending in any interesting item of news suitable for this department.*)

Mr. Carl G. Fisher, President of the Indiana Automobile Club, while discussing the objects of the club recently, said:

"I made two automobile trips through Indiana last summer, and covered nearly a thousand miles. In all this riding I saw but two signboards. One of these was so weather-worn that it could not be read. Signboards are one of the many conveniences that can be added to country travel, and our club will have for its object the furthering of all such schemes. We want to make country travel a pleasure, and all such things as good roads, signboards, drinking places and the like, are of material advantage."

To go out on an automobile for a tour is a little different from taking it on a wheel. In the case of the latter, should you for any reason chance to be left behind, all the companionship you can enjoy is your own, unless you are mounted on a tandem. This is not so in the case of the automobile. It is not much of a motor vehicle which does not accommodate at least two passengers. If anything should go wrong you have at least one companion in tribulation, which, on some occasions, is a real pleasure.

There is something particularly interesting about any race or competition which is international in scope, as is the Gordon Bennett contest. The Automobile Club of France, which has, ever since its inception, taken so great an interest in automobile races of all kinds, is also vitally connected with this proposed race which is scheduled to take place some time during the first week of May. Up to the present time England, Germany and Belgium have sent in challenges. In commenting upon this matter the Paris *Figaro* says: "It is to be hoped that the foreigners will have better vehicles than those which entered for the race last year." It may be added that no American vehicles are likely to compete.

It seems as though Norway and Sweden would prove quite a profitable field for the American automobile manufacturer. There are some countries which look to America from something like force of habit, for the best things along certain lines. Automobilists in the countries named are looking to America for an automobile which will be satisfactory, and perhaps it would be well for manufacturers to look further into the matter of being properly represented over there.

From May 25 until June 6 an automobile exposition is to be held at the Prater, Vienna. Motor vehicles of all kinds will be on show, and the Automobile Club of Austria is making efforts to have foreign-built vehicles entered free of duty, on condition that they be returned after the show.

The automobile is gaining an entrance to all phases of work, and in all parts of the world. It has invaded Arizona and will compete with the railroad and supplement the stage as a means of reaching the Grand Cañon. If plans, as at present under way are carried out, it will be possible for passengers to leave the Santa Fe Route train at Flagstaff, Arizona, and ride over to the Grand Cañon, about sixty miles away, on an automobile 'bus. The novelty of a ride in an automobile more than a mile above the sea level will add immensely to the enjoyment of the trip.

The following statement appears on the letter heads of the National Good Roads Association. "Ninety-nine per cent. of every load by railroad, steamship or express, must be carried in a wagon or truck over a highway. It costs the farmers of the United States nearly three times more than those of Europe to market an equal tonnage of farm products over primary roads." Enough said.

In our February number, the poem entitled "The Dream of the Scorcher," also the verses on page 140, of the same issue, should have been credited to *The Motor World*. This was brought about by our taking them from a source which failed to give our esteemed contemporary credit.

A Winton Postal Delivery Wagon

THE Winton Motor Carriage Co. is the first concern which has actually constructed motor vehicles for the service of King Edward VII. The first of three of these carriages was recently shipped from this country to Australia, where it is to be used in the governmental postal service.

The order when first given, called for the letters "V. R." on the side, but as in the meantime Queen Victoria died, the letters were

Postal Wagon for Australian Government

changed to "E. R." Three of these machines have been ordered, each of them weighing 1,700 pounds. The motor is of 9 horse-power. The capacity of the wagons is from 800 to 1,000 pounds of mail. The vehicles are beautifully finished, and are really fine specimens of motor vehicle construction. The Winton Company is to be congratulated upon this triumph, and there are good reasons to believe that this first order will be followed by others.

The Philadelphia Show

THE Automobile Show held in Philadelphia from February 4 to 9 proved to be an eminent success from all points of view.

Considerable skepticism prevailed about the matter, in view of the fact that only the week previous a cycle show had been held there at which a number of motor vehicles had been exhibited.

The Second Regiment Armory, in which the show was held, was decorated in a very tasty manner and presented a very gay appearance, especially at night when the electric lights on the various exhibits were turned on. As to these exhibits, their character and scope, nothing but words of commendation should be spoken of them. Their arrangement was excellent, and while, perhaps, the show did not bring out much that was absolutely new or startling, it must be conceded by all that those builders who were represented did themselves credit.

That the people of Philadelphia are interested in the automobile was evidenced by the great numbers who turned out. The evenings called out a large attendance, making it somewhat of a task to pass around the exhibits. Those in charge of the different exhibits were kept busy explaining their various products, and several reported excellent results in the way of orders.

The contests, all of which took place during the evening, proved very exciting. The crowd which nightly thronged the building worked itself up into a fervor seldom seen on such occasions. The contestants certainly did not languish for encouragement on the part of the visitors. It was very seldom that the track was clear of machines entirely. One which attracted great attention and was a general favorite for those who wished to take their first automobile ride was the "White Lady," made by the Automobile Company of America. Decorated by a basket filled with choice flowers this machine looked pretty and was quite popular. This company was declared winner of the first prize and silver cup for gasoline machines.

The De Dion booth was also the center of attraction at almost all times and genial Mr. Craven was kept busy explaining the various features of this popular little carriage. The gentleman referred to made the trip from New York to Philadelphia in his carriage, and reported that in spite of the cold weather and snow he had an excellent run.

The Locomobile Company of America had an excellent exhibit, which was arranged in a beautiful manner. Just across the way from them was the Mobile Company. The machines of this company made an excellent showing in several of the contests. Mr. Frank Mullan was very much in evidence, and seemed exultant over the reception accorded the "Mobile." The booth of Maurice Loeb was a rendezvous for a great many of the visitors. The space was prettily decorated, being hung with beautiful tapestry. The Milwaukee Automobile Company had one of their runabouts on exhibition which created quite a favorable impression. Mr. Chester I. Campbell, of Providence, R. I., was in charge. Mr. Campbell has charge of the Eastern business of this company, which is building a reliable and satisfactory line of vehicles.

It would not be possible for us to go into detail regarding all the exhibitors. Each one made a creditable showing. There was not one exhibitor who did not make a good impression along his own particular line. The makers of accessories were well represented, especially the "Neverout" Lamp Company, which had an imposing booth in the center of the building.

The arrangement of the track was excellent. Between the inner side of track and the central exhibiting space was an aisle, which ran around the whole of the track. This enabled visitors to witness the track events without in any way interfering with those wishing to look at the vehicles on exhibition. Judging by the character of exhibits, attendance and enthusiasm on the part of visitors, together with the large number of serious inquiries, there can be no doubt of success. A word of congratulation to those gentlemen who had the arrangement of plans in hand is in order. They worked long and hard, and to them is due great credit.

The Boston Automobile Show, which is to be held at Mechanics Building in that city, March 4 to 9, inclusive, will be under the management of the local automobilists and members of the Massachusetts Automobile Club, and is purely for the purpose of giving prospective purchasers an opportunity of seeing all the latest ideas and improvements in automobiles and their accessories. Full information regarding this show may be obtained by addressing Fred. S. Ashley, 216 Washington Street, Boston, Mass. This show has been indorsed by the National Association of Automobile Manufacturers.

A New Delivery Wagon

THE delivery wagon shown in the accompanying half-tone possesses a number of new features. The builders, the Kidder Motor Vehicle Company, of New Haven, Conn., have put into practice in this wagon some ideas which might by some other manufacturers be called absurd. Among them may be mentioned the

The Kidder Delivery Wagon

discarding of ball bearings. Such bearings are certainly the cause of much annoyance and anxiety. If it were possible to secure the perfect ball and cone it might be otherwise, but in the absence of these, the element of uncertainty and consequent anxiety is introduced by their use.

The running gear of this wagon consists of a triangular, seamless, drawn steel, tubular frame, suitably braced. On this are mounted the boiler and the horizontal engines, of which there are two, one on

each side of the boiler. Below the front elliptical spring is a rocker pivot, which provides for uneven ground, without wrenching. The transmission of power is direct, by means of a steel pinion engaging with the main differential gearing. By this means of driving provision is made for the torsional action of the springs without friction.

The boiler is of the vertical tubular type, 16 inches diameter and 18 inches high. It contains 326 No. 20 copper tubes, giving 56 square feet of heating surface. The fuel used is ordinary stove gasoline. The tank capacity is 10 gallons. The total weight of this wagon is 2,750 pounds, while its load capacity is 1,600 pounds, at a speed of 8 miles per hour. Wooden wheels, 32 and 34 inches diameter respectively, are used, having solid tires. Wheel base is 66 inches.

The parts of this whole machine are built on the interchangeabie plan. The wagon is substantially constructed, with the idea of standing up to hard, continuous service over all kinds of roads, and ought to commend itself to those contemplating the use of motor-driven wagons for such service as this is adapted to.

The Searchmont Wagonette

A CARRIAGE which attracted a great deal of attention at the recent Philadelphia show, was the wagonette made by the Searchmont Motor Co., 1230 Orkney Street, Philadelphia. Its graceful appearance was admired by all who saw it. It certainly is a handsome sample of automobile construction. It is an improvement of the well known French voiturette, sitting very low, thus rendering it easy of access.

Bicycle spoke wheels are used, but the spokes are of unusually large diameter, insuring safety. While the spokes are not by any means too great in diameter, it certainly makes one feel less worried, because automobile wheels are sometimes uncertain factors.

These vehicles can be fitted with either a 5 or 10 horse-power engine. The workmanship put on them, as well as the quality of material used, is of the best character. The various parts are made on the interchangeable plan, and are also readily accessible. This system permits of the carrying of spare parts. Anyone familiar with the subject will recognize the value of this feature. It is no fun to be stuck on the road simply because the part which may have been rendered useless cannot be duplicated. The Searchmont is so built as to make

many parts capable of being readily duplicated while out on the road. What is more, the taking out and putting in of these is so simple as to be easily understood by any intelligent driver.

The wheel base is 5 feet, the gage being standard, 4 feet 8 inches. The wheels are all 32 inches diameter, thus rendering it necessary to carry but one size of spare tire, should it be thought wise to do so.

The 10 horse-power motor has two cylinders, vertically arranged.

The "Searchmont" Carriage

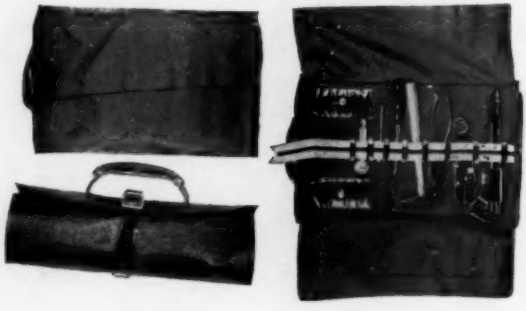
The cranks are all encased and run in oil, access to the crank chamber being by hand-holes, which are closed while the motor is running. Ordinary stove gasoline is used, the gasoline tank capacity being five gallons, which ought to take the carriage about 100 miles over ordinary roads. The seat is quite roomy, and should it be desired an extra seat for a third person can be put in the front. The control of the machine is accomplished by levers, all fitted on the steering column. The gearing used will give a maximum of twenty miles per hour, a

hill climbing gear of five miles and a reverse speed of five miles per hour. The seat is covered with pegamoid, which in the matter of wearing qualities is superior to leather. This material is waterproof, The body is strongly built and beautifully finished. It is entirely free of machinery, this being swung on springs, entirely free from the frame. The carriage embodies the latest improvements in motor vehicle construction.

A New Tool Set

NO thorough automobilist would think of going away on a trip, be it a long or short one, without first of all making sure that he was well equipped in the way of tools necessary to effect any repairs which may be called for on the way.

Machines need watching. They sometimes fail to do just what their builders intended they should. This being so, the next best thing for the automobilist to do is to see that he is well prepared.



The automobile tool set shown in the accompanying illustration, is furnished with just the tools necessary, no more nor no less. The parties who decided what tools should be put into the case are expert operators, and their decision was based on actual personal experience.

It does not contain a number of tools which are very seldom called into service, nor does it lack those tools, such as monkey wrenches, etc., which are so much in demand. The set is kept in a suitable case, and when closed up does not occupy much space. This set, which is new, is being put on the market by the St. Louis Automobile and Supply Co., 23d and St. Charles Streets, St. Louis, Mo.

Automobile Club Directory

Under this heading we shall keep a record of the motor vehicle clubs both of this and other countries, and we hope to have the co-operation of club officers in making it accurate and complete.

*Corresponding clubs of the Automobile Club of America are designated thus *.*

Automobile Club of America, Malcolm W. Ford, Secretary, 203 Broadway, New York ; representative on International Racing Board, Clarence Grey Dinsmore ; Substitute, John H. Flagler.

Automobile Club of New Jersey, Secretary, Dr. H. Power, Montclair, N. J.

Automobile Club of Baltimore, W. W. Donaldson, Secretary, 872 Park Avenue, Baltimore.

Automobile Club of Brooklyn, Secretary, C. Benton Dix, Hotel Clarendon, Brooklyn.

*Automobile Club of Columbus, O., C. M. Chittenden, Secretary, Broad Street.

Chicago Automobile Club, Secretary, H. M. Brinkerhoff, Monadnock Block, Chicago.

Indiana Automobile Club, Indianapolis, Ind. Secretary, August Kabich.

Long Island Automobile Club, Secretary, Charles W. Spurr, Jr., 552 State Street, Brooklyn.

Automobile Club of New England, Secretary, Geo. E. McQuesten, Brookline, Mass.

*Cleveland Automobile Club, L. H. Rogers, 357 Amesbury Avenue, Secretary, Cleveland, O.

*North Jersey Automobile Club, E. T. Bell. Jr., Secretary, Paterson, N. J.

*Automobile Club of Rochester, Frederick Sager, Secretary, 66 East Avenue, Rochester, N. Y.

Massachusetts Automobile Club, President, J. Ransome Bridge ; Treasurer, Conrad J. Rueter ; Secretary, L. E. Knott, 16 Ashburton Place, Boston, Mass.

Pennsylvania Automobile Club, Secretary, Henry J. Johnson, 138 No. Broad Street, Philadelphia.

*Philadelphia Automobile Club, Frank C. Lewin, Secretary, 250 No. Broad Street, Philadelphia, Pa.

Automobile Club of Bridgeport, Secretary, Frank W. Bolande, 208 Barnum Avenue, Bridgeport, Conn.

Rhode Island Automobile Club, Secretary, Frederick C. Fletcher, P. O. Box 1314, Providence, R. I.

San Francisco Automobile Club, B. L. Ryder, Secretary, San Francisco, Cal.

Columbia College Automobile Club, Lewis Iselin, Secretary, Columbia College, New York, N. Y.

*Buffalo Automobile Club, Secretary, Ellicott Evans, The Lenox, Buffalo, N. Y.

Worcester Automobile Club, Worcester, Mass., Vice-President, J. W. Bigelow ; Marshal, W. J. H. Nourse.

AUSTRIA.

Budapest—Magyar Automobil Club, 31 Musem Korül.

Innesbruck—Tiroles Automobil Club, Rudolph-Strasse 3.

Prague—Prager Automobil Club.

BELGIUM.

Antwerp—Automobile Club Anversoir, 34 r. Longue de l'Hopital ; President, Baron de Bieberstein.

*Brussels—Automobile Club de Belgique, 14 Pl. Royale ; Moto-Club de Belgique, 152 Boul. du Nord ; Touring Club de Belgique, 11 r. des Vauniers.

Charleroi—Automobile Club de Charleroi, Hotel de Esperance.

Ghent—Automobile Club de Flandres.

Liege—Automobile Club, Liegeois, 2 r. Hamal.

FRANCE.

Amiens—Automobile Club de Picardie, 36 r. de La Hotoie.

Avignon — Automobile Club de Avignon.

Bordeaux—L'Automobile Bordelais.

Dijon—Automobile Club, Bourguignors Cafe Americanie.

Lyon—Bicycle et Automobile Club de Lyon; Motor Club de Lyon, 3 pl. de la Bouise.

Marseilles—Automobile Club de Marseilles, 61 r. St. Fereol.

Nance—Automobile Club, Lorrain, Thiers pl.

Nice—Automobile Velo, Club de Nice, 16 r. Chauvain.

*Paris—Automobile Club of France, 6 pl. de la Concorde; Motr-Club de France; Touring Club de France, 5 r. Coq-Héron.

Pau—Automobile Club, Bearnais Ave. de la Pau, President, M. W. K. Thorn.

Périgueux—Veloce Club, Perigourdin, Hôtel de Commerce.

Toulouse—Automobile Club, Toulousain Café Riche, pl. St. Etienne Société des Chaffeurs du Midi, 25 r. Roquelaine. President, M. Gay.

GERMANY.

Aachen (Aix la Chapelle)—Westdeutscher Automobile Club, Hotel Grand Monarque.

Berlin — Mitteleuropaischer Motor Wagen Verein, I. Universitatstrasse, Herr A. Klose; Deutscher Automobil Club, Liusenstrasse, 43-44.

*Deutscher Automobil Club, Liusenstrasse, 43-44. President, S. D. Herzog, Victor von Ratilin.

Dresden—Radfahrer-und Automobilisten Vereinigung; Dresdener Touren Club.

Eisenach—Mitteldeutscher Automobil Club; Motorfahrer Club, Eisenach.

Frankfort am Main — Frankfurter Automobil Club, Restaurant Kaiserhof.

Munich—Bayer. Automobil Club, 33 Findling Strasse.

Stettin—Erster Stettiner Bicycle und Automobil Club.

Strassburg—Strassburger Automobil Club.

Stuttgart—Suddeutscher Automobil Club; Wurtembergischer Motor Wagen Verein.

GREAT BRITAIN.

Birmingham — Motor and Cycle Trades Club, Corporation street.

Edinburgh — Scottish Automobile Club.

Liverpool—Liverpool Self-propelled Traffic Association, Colquitt street. Secretary, E. Shrapnell Smith.

*London—Automobile Club of Great Britain and Ireland, 4 Whitehall Court, S. W. Hon. Secretary, C. Harrington Moore.

Nottingham Automobile Club, Secretary, A. R. Atkey, Nottingham, England.

HOLLAND.

Nimegue—Nederlandsche Automobile Club.

ITALY.

Milan—Club Automobilisti Italiani 6 via Guilini.

*Turin — Automobile Club d'Italie Via Vittorio Amedeo II, 26.

RUSSIA.

Moscow — Moskauer Automobile Club, Petrowka, Hauschnow.

St. Petersburg — Automobile Club de Russe, President, M. Delorme.

SPAIN.

Madrid—Automobile Club de Madrid.

SWITZERLAND.

*Geneva — Automobile Club de Suisse, 9 boul. de Theatre.

THE AUTOMOBILE MAGAZINE

A Live Journal for all interested in Motor Vehicles

VOL. III NO. 3 NEW YORK, MARCH, 1901 PRICE 25 CENTS

Published Monthly by
THE AUTOMOBILE PRESS,
95 LIBERTY STREET, NEW YORK.
Telephone: 984 Cortlandt. Cable Address: "Loceng," N.Y.
ANGUS SINCLAIR, President. JAS. R. PATERSON, Secretary.
FRED H. COLVIN, Vice-President and Editor. JAS. J. SALMOND, Associate Editor.
WM. H. MAXWELL, JR., Special Representative.

BOSTON OFFICE, 170 Summer Street. PHILADELPHIA, The Bourse.

Subscription Price, $3.00 a year in the United States, Canada and Mexico. Foreign Countries in the Postal Union, $4.00 (gold). Advertising Rates on application.

Copyrighted, 1901.

Entered at New York Post Office as second-class matter.

For Sale by Newsdealers everywhere.

The Storing of Gasoline

THE safe storage of a moderate quantity of gasoline—say a barrel or two—is a question which every owner of either a steam or gasoline machine must meet and solve. It is not economical or convenient to buy less than a barrel, and yet this quantity requires careful storing to make it safe around your premises.

Safety barrels are on the market, which seem to meet with considerable favor and allow the gasoline to be stored above ground so it can be drawn from the faucet (which is locked) as easily as water from the city main.

Others sink a barrel in the ground and have suitable pipes for filling and discharging. The discharging is usually done by forcing air on top of the gasoline, causing it to rise in the discharge pipe. Others pump it direct by a lift or suction pump.

Any practical suggestions for the safe storage of the all-important fuel will be welcomed in these columns.

An Invitation

IN the January number of this magazine an invitation was extended to those who had practical automobile experience to send us for publication accounts of same. This invitation has been fruitful, and called out contributions from some of our friends. There is a very strong feeling on our part, however, that there must be many more who are from time to time enjoying trips which bring out interesting facts that would be relished by automobilists generally.

It cannot but be for the good of automobilism all around if those records are made public. Perhaps there are some who hesitate on the score of not being able to frame their account in language becoming a magazine. What the other man wants are the facts. If you will send these in, the editors will attend to the rest. Photographs, which may have been taken while on tours, are always welcome. These are proof of the practical utility of the automobile, and that it is not merely a toy.

Then again, there are men connected with the manufacture of automobiles who might send in contributions relating to the mechanical problems involved in construction.

Last, but not least, we desire information from those who have adopted motor vehicles for business purposes. This is an ever-widening field. Many business houses have already gone into it; many others are just about to do so. Before doing so, much study must be given to the comparative cost of horses and the newer methods. What we want is some statement as to the facts which led to the abandonment of the horse, as well as particulars about results obtained with the self-propelled vehicles.

Any and all who can give us anything likely to interest our readers are invited to correspond with us. No one can stand up and declare he knows all there is to know about the automobile. It is by the interchange of ideas that we become better acquainted with any given subject, and all we can hope is that the columns of THE AUTOMOBILE MAGAZINE will be made use of in the manner suggested.

Mohler & DeGress, of Mexico City, Mexico, have secured a factory at 284 Albert Street (near Broadway and Steinway Ave.) Astoria, L. I. City, and will manufacture gasoline engines, radiating coils, pumps, transmission gears and voiturettes. They will also rebuild autos.

Operation of Electric Delivery Wagons

BY W. H. MAXWELL, JR.

PART II

WITH the last number began a series of articles dealing directly with the cost of operating and maintaining automobile delivery services. In succession, electricity, gasoline and steam are to be considered, and the actual results obtained by the ordinary user will be set forth, accompanied when necessary by exact statements of the conditions subject to which the results conform.

The accompanying story has for its object the giving of a few points, gathered by experience, in regard to electric vehicles. In making tests of any other kind of machinery it is very nearly always the case that the conditions under which the tests are made are held as favorable as possible to the mechanism. The locomotive operates on a smooth rail; the trolley car ditto, and both by persons who have been taught how to run them. All that is asked of the stationary engine is that it run, do the work. What are the usual conditions under which an automobile is started on the high road to prosperity, or more often ruin? A case in point will illustrate much more satisfactorily.

The writer sold an electric vehicle, delivery wagon, capacity about fifteen hundred pounds, to a confectioner on One Hundred and Twenty-fifth Street, New York city. The gentleman in question who purchased the rig stated in direct terms that he knew nothing whatever about an electric vehicle, and would cheerfully follow any advice or instructions given him as to its care, maintenance, etc. It not being in the writer's power to do anything further in the matter, the

company which built and sold the vehicle had a plain duty laid on it to see that competent advice was given its customer. Here is the first and indeed one of the greatest elements of failure in the operation of motor delivery wagons. So many concerns are manufacturing (?) automobiles, either to get the immediate profit from the sale of a number of poorly constructed vehicles, or are turning out just about a sufficient number of vehicles to admit of their being styled manufac-

Fig. 1.—Delivery Wagon Built by the National Automobile and Electric Company

turers and so be bought up by their larger and stronger competitors. They make no attempt to serve the consumer, but are simply stock jobbing or worse.

In the case quoted, the confectioner stated that he had engaged the services of a competent electrician. Instead of showing the interest that it might be fairly expected they would in their product, the officers of this selling concern made no attempt to test the qualifica-

tions of the man who was to take their product out on the streets and exhibit it to the multitude, and to those wavering spirits just about on the verge of investing in a motor delivery wagon. The same old story resulted. Made by a poorly managed concern, the wagon gave trouble from the start. The confectioner was told it was all the fault of the driver. The vehicle spent half its time in the shops and now the company has put a sixteen or seventeen year old boy on the vehicle as an expert operator. What can one expect of any mechanism so handled? Added to this are the naturally adverse conditions standing as a constant menace to the motor delivery wagon's perfect operation—rough pavements, the constant jarring of the mechanism, and the gradual depreciation of the vehicle through use. Therefore, in making a study of the results shown by any delivery wagon or truck it is necessary that the common sense of the user and the honesty of the manufacturer be taken into account.

Fig. 1 is a vehicle so built that it can be used as a light delivery wagon or a pleasure vehicle by merely changing the top or superstructure. The carrying capacity of any such vehicle is about five hundred pounds of paying load. Fig. 2 shows a truck. The capacity of an ordinary storage battery truck is about two and one-half tons. But few companies in this country have made any determined attempt to build electric trucks, and the makers of the one illustrated can be said to be the only American firm which has made a success of the venture.

The great difficulty which obstructs the development of the heavy electric vehicles is that the wagon itself, because of the excessive weight of the batteries, must weigh considerably more than the load in order to move it. The truck shown more nearly approaches a fair proportion between the sustaining force and the maximum load than any other yet built, and for that reason its designers are entitled to the highest praise.

In France, the Saye Sugar Refining Company has recently had a truck delivered to it by the makers, which tips the scales at 24,000 pounds or twelve tons. It has a carrying capacity of but ten tons, or only 20,000 pounds. In all, the power must be at hand to move twenty-two tons or 44,000 pounds. This illustrates the difference between American and foreign construction.

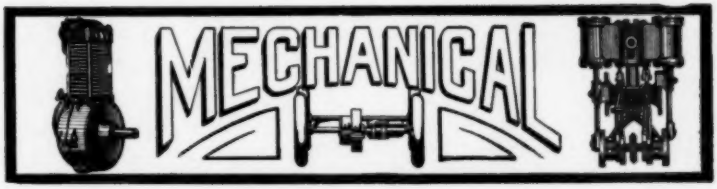
At this time there is a line, because of the present status of the battery question, between the points where the electric vehicle is commercially successful and where it is not. What gives the electric

vehicle the hold it undeniably has on the commercial world? First of all comes that point in its favor, which is possessed by all machinery—its increased capacity for work over animal power. Second, its adaptability to design. Third, its ease in management, and lack of necessity for any great amount of mechanical skill in its care. Fourth,

Fig. 2.—Electric Truck Built by Riker

its inoffensiveness as to odor, vibration, noise, etc. The electric vehicle with a carrying capacity up to three tons has proven itself all that could be wished, and considered as a purely business proposition it is a success.

(To be continued)



The Final Automobile

HUGH DOLNAR

IV.—Fuels and Combustion

THE principal fuels now used in motor-driven road wagons are coal, coke, shale products, the various petroleum distillations, from kerosene to gasoline, and alcohol. All liquid fuels have great advantages in the way of handling and moving, and in consequence some of them are used for firing steam boilers, most commonly with the liquid fuel carried in tanks under an air pressure of from 25 to 40 pounds, this air pressure being needed to force the liquid fuel through the small holes usually employed in the burners.

There are other possible fuels for internal combustion motors in the form of finely divided carbonaceous materials, such as wheat flour, corn meal, starch, sugar and wood dust. Wood dust, and flour made by grinding grain, are well known to form violent explosive compounds when mixed with air, a very surprisingly small quantity of flour or wood dust having in many instances proved sufficiently powerful, when accidentally ignited, to wholly demolish substantially built mills and factories. So far as is known to the writer, there are no records of any attempts to fire internal combustion motors with any of these powdered fuels, but there is no obvious bar to their successful use. Very finely powdered wood fiber seems likely to be a cheap fuel, and corn meal, here in America, at least, would also have the merit of low cost, corn often being used in place of coal on Western farms.

The powdered fuels would also be clean and safe, as none of them can be readily lighted in bulk, although they are very easily fired when diffused in hardly perceptible quantities through the air contained in the closed rooms of a mill or factory. Wheat flour is the only one of these finely powdered fuels which is everywhere obtainable; it can un-

doubtedly be made to form explosive mixtures with air if ground fine enough. In the cases where flour mills have been destroyed by explosions, the flour dust floating in the air was probably much more finely divided than the ordinary flour of commerce. Powdered fuels could be very easily drawn into motor cylinders, and the subject is interesting as a speculation, although the lack of recorded experiments deprives guesses in this direction of any appearance of authority. It is quite certain, however, that in the near future powdered fuels for cylinder fired motors will receive close attention, because there is now no wholly unobjectionable fuel known for use in wagon engines.

Very efficient, and in some ways highly satisfactory burners for firing steam boilers are shown in the Stanley, and similar wagons, using gasoline for fuel, usually of 76 degrees; the Winton motors use 76 degree gasoline in warm weather, and 86 degree fluid in cold weather. There seems to be no way to make the use of gasoline for firing steam boilers really safe. Accounts of the burning of two locomobiles have appeared in the daily papers quite frequently and it seems very difficult to so construct a gasoline burner that it is impossible to form and light a puddle of this very dangerous fluid. So long as any sequence of occurrences can make the production and firing of a puddle or tank of gasoline possible, so long accidents may be expected to occur, no matter how remote the probability of the possibly disastrous chain of events may appear to be. If the fuel is turned on in a gasoline boiler firing burner and the flame goes out, then a puddle of gasoline can be formed, and, an attempt to relight the burner may be followed by a flash of flame several feet high, quite sufficient to bring panic to passengers, and destruction to the vehicle. Somewhat similar conditions obtain in the use of gasoline for firing internal combustion motors, and in point of fact, gasoline must be held as a very dangerous agent under all circumstances. So far, the extreme ease with which gasoline vaporizes has made it the favorite fuel for cylinder fired motors, but it is certain that the increasing use of these motors in wagons will lead to so many serious accidents that fuels other than gasoline will be dilligently sought, and that something really and certainly safe will be found to take the place of the more volatile hydrocarbons in motor wagon driving. Gasoline not only vaporizes readily, but it is a very thin and subtile liquid, and leaks through an extremely small hole when placed under the air pressure needed for boiler burners. For the sake of lightness the tanks are made of very thin sheet metal, and many serious accidents have re-

sulted from leaking gasoline tanks. This whole pressure-containing gasoline tank element is fraught with serious difficulties and inconveniences, as well as grave dangers. It is a matter of much labor to pump up the air pressure in a good sized gasoline tank, and many wagon drivers find this very objectionable. If a mechanically driven pressure-governed air-pump is added to the wagon machinery it is a costly complication, although the fact that this air pump may also be used to inflate the wheel tires, goes far towards warranting its installment. But no matter what the point of view is, a great many valid and forceful objections to any use whatever of gasoline are in plain sight. Insurance companies place this fluid under ban, and enforce the most stringent regulations against its presence on premises underwritten ; it is a costly fuel, and it is the cause of very frequent loss of life. In spite of all this formidable list of really prohibitive disqualifications, gasoline is the principal fuel used in road wagons at the present time, yet it seems sure that its many and great disadvantages will cause its speedy retirement from the field of automobilism.

The least certain function of the gas engine is the lighting of the charge, and builders of these motors are constantly striving to obtain a sure ignition of the charge. The easiest lighted charge is a mixture of fixed gas and air. Air and gasoline vapor come next, and a mixture of kerosene, or common illuminating oil and air is the most difficult of the three to ignite. To obtain a vapor from gasoline and mix it with air for the cylinder charge a great variety of forms of "carbureters" as they are called, are used, many of which depend for their action on drawing the air for the charge through liquid gasoline. All such devices have the very great disadvantage of vaporizing the more volatile parts of the gasoline first, leaving a residue of heavier fluid which is less easily vaporized, and thus often causing a motor which works well when the gasoline tank is newly filled, to become uncertain in action when the gasoline supply is only partly used. Pennington was never in favor of the carbureter in any form, and admitted his gasoline directly to his cylinders, gravity feed and needle valve regulation, and his "war chariot" at present attracting some attention in England, introduces the fluid gasoline directly to the cylinders. Secor, maker of the Secor kerosene oil fired motors, also delivers the liquid kerosene directly to his cylinders, at a place where the metal is only blood warm after the engine is started and working. To start the Secor engine it is needful to heat the part of the engine where the kerosene is admitted to a black heat, hot enough to vaporize the ker-

osene, but not hot enough to burn it, using a hand-moved kerosene "Primus" torch for this purpose. By this means Secor obtains a hot vapor of kerosene for the first few strokes of his motor; these first strokes heat the combustion chamber sufficiently to vaporize the kerosene subsequently delivered in the form of cold liquid or spray to the cylinder. It is impossible to avoid the conclusion that no carbureter whatever is needed for use with the internal combustion motor, and it is certain that no possible form of carbureter can be devised which is free from serious objections. Hence the conclusion that the final automobile, if driven by an internal combustion motor, will not use this troublesome and uncertain device in any form.

Kerosene, common oil for use in lamps, has many and great advantages for wagon driving fuel. First, it is cheap, very much cheaper for heat units contained than gasoline. Next, kerosene is everywhere to be had, since almost all grocers, in town and country alike, supply it. Finally, kerosene is safe against accident by fire, absolutely safe when compared with gasoline.

These obvious points in favor of the use of kerosene for road wagon fuel seem to found a strong probability that kerosene fired wagons will very soon displace all gasoline using vehicles, although so far, only a very few kerosene fired wagons have been shown, Koch and Root and Venables being perhaps the best known makers of kerosene burning wagon motors. The principal objection to the kerosene fired motor is the vile odor of the exhaust, which is due solely to imperfect combustion.

Everyone knows that a good kerosene burning lamp can be lighted and burned in a closed room without the production of any perceptible odor. The inoffensiveness of the lighted lamp results from the perfect burning of the kerosene oil, and from no other cause whatever. If kerosene oil can be as perfectly consumed in the cylinder of a motor as it is in a good lamp, then there will be absolutely no odor from the exhaust. So far, this absolutely complete combustion has not been produced in a motor cylinder, although a fairly good approach to perfect burning is made by some motors for quite extended periods of time.

The conditions needful to ensure the perfect burning of a fuel are, first, a sufficient supply of air, and second such a presentation and contact of air and fuel as will give every atom of carbon its opportunity to combine with oxygen in certain exact proportions, which are unvarying for each form of fuel burned. Third, there must be enough

time for burning to enable a perfect combination of the fuel and the air.

When a compressed charge of air and fuel is fired in a motor cylinder or combustion chamber provided with a window, a white flame is seen to instantly fill the whole enclosed space, no time, apparently, elapsing between the firing of the charge and the filling of the charge enclosing chamber with a brilliant white flash. It is certain, however, that the formation of this flame must take some time, and it is the general rule that the more time fuel has in which to burn the more perfect the combustion that can be effected. The necessity of this time element of combustion is fully recognized in dealing with the slow burning fuels, such as coal and wood. The extreme quickness with which a compressed volume of air and gas can be made to flash into flame, seems to have prevented a full recognition of the fact that a certain appreciable time duration is an essential and indispensable factor in obtaining such a thoroughly complete combustion of liquid fuel vapors derived from either gasoline or kerosene that there shal be no odor perceptible in the combustion product.

In the case of the burner for firing the steam boiler the combustion is continuous, and occupies all of the running time of the motor. Not only is the combustion continuous, but with the form of burner used with the Stanley boiler the separate burners may be indefinitely multiplied, and hence the combustion time may be extended to any required degree for a given fuel consumption. Because of this ample combustion time the Stanley burner, and perhaps other steam boiler firing devices, are absolutely noiseless in action, and burn the fuel so perfectly that when the fire is small enough the current of combustion products may be breathed at the uptake, with no other perceptible sensations than those caused by breathing a current of pure warm air. This is a very different result from that obtained by burning vaporized fuel in any form of internal combustion motor known to the writer. The exhaust from a gas engine is rarely invisible, and never without some odor, and in a vast majority of instances this odor is very pronounced and highly offensive.

The lighting of the fuel which drives a motor wagon is a problem presenting many practical difficulties. In the steam driven wagons it is customary to heat certain parts of the burner by means of a hand applied plumber's gasoline fired torch, until the fuel begins to vaporize, when it may be lighted and thereafter vaporizes its own fuel without exterior assistance, so long as the fire continues to burn. Since

the product of combustion from these burners contains very little or no free oxygen the fire is instantly extinguished by the slightest "back draught," or reversal of direction of the uptake current ; after such an accidental extinguishment the fire may or may not be lighted again without the use of the hand applied torch. This separate portable torch is a highly objectionable feature, conducive to accident and inconvenient of application, and seems likely to be superseded by some built-in device, forming an integral part of the wagon motor which shall be safe, of ready and certain action, always in place and convenient to use. All of the motors requiring the use of a hand-applied torch in starting are slow in action. The Stanley burner can be fired quickly, and steam at 25 lbs. can be generated in about 4½ minutes from the application of the torch to the burner when the boiler is filled with cold water. Some forms of internal combustion motor require much more time for preliminary heating. The Secor and the Hornsby Akroyd motors require the application of the torch from 15 to 25 minutes, both these motors using kerosene fuel. On the other hand, some of the gasoline burning wagon motors, as the Winton and De Dion, start in a very few seconds, four or five, when all is in good order, with no preliminary heating whatever, the fuel being gasoline, which is a very great point gained. It is true that the gasoline fired internal combustion motors do not always start so promptly, and that even experienced drivers are often unable to start such motors for a long time, and have much difficulty in finding the cause of delay.

The first gas engines ignited the charge by the direct application of flame to the uncompressed mixture in the cylinder. The next step was the use of a hot tube, the interior of this tube being in direct communication with the interior of the charge compression chamber. The latest form of ignition, as in the Diesel motor, dispenses with all auxiliary forms of igniter, the air charge being compressed to igniting temperature so that it lights and consumes the fuel supplied during the working stroke by its own great heat due to a very heavy compression. This high compression of the air, the pressure employed being from 500 to 800 lbs. per square inch, is the cause of the unexpectedly slow introduction of the Diesel motor, which although extremely economical in the use of fuel, has the almost prohibitive drawback of a piston pressure too great to be obtained with ease and comfort ; it must always be borne in mind that all workers, mechanical as well as animal, have their limits of endurance, which cannot profitably be exceeded in any direction. The pressures demanded by

the Diesel system are beyond the comfortable limit, and seem certain to greatly restrict the practical application of the motor, although it is absolutely faultless in theory, and has the very great advantage of requiring no separate charge igniting device.

Where the hot tube is used to ignite the cylinder charge a separate burner is required to heat the tube, usually made of platinum or nickel, to the high temperature which it must have. When the fuel charge is in the process of compression it is constantly made more and more easy to light ; hence the time of charge ignition by the hot tube is entirely beyond regulation to suit the actual needs of the motor at the moment. Again, the hot tube must be hotter than is comfortable and durable, and consequently requires frequent renewals ; the separate fire for heating the hot tube is also a source of care and annoyance to the wagon driver.

These faults of the hot tube led to the employment of the electric spark for charge ignition, and although the spark has not yet been produced by any form of mechanism which can be said to be wholly without drawbacks, it has the vast merit of being non-existent until the time for its action with the best effect. With spark ignition the charge may be compressed to far beyond the usual pressure without danger of too early ignition. The point of charge firing can be either advanced or retarded at the will of the driver, by very simple and easily actuated regulating elements. This great advantage of firing time adjustability makes it apparently sure that for ordinary road wagon service electric spark ignition will very soon entirely displace the hot tube. For war use, in case the automobile should ever become a recognized detail of army equipment, it is possible that both the hot tube and the electric spark ignition may be supplied for the same motor, the hot tube to be used when from any cause the electric spark fails to appear as desired. At present, the efforts of a multitude of inventors and investigators are directed towards the production of an entirely satisfactory electrical equipment for road wagons, and it is of course certain that such an equipment will soon appear, many as are the faults of all spark producing devices in present use.

The higher the charge compression the more ready of ignition it becomes, and the more economical the motor is in fuel consumption. It is, however, much more difficult to obtain a fuel compression of say 70 or 80 lbs. to the inch than to compress the charge to about 45 lbs., as obtained when the combustion chamber cubic content is made one-half the volume of this piston displacement, which is now a very common proportion in vehicle motors.

Here, however, the question of charge contamination by burned and inert combustion products is introduced. The cylinder is cleared of combustion products by the travel of the piston, but the combustion chamber in most forms of motor remains filled with burned product at the time when a fresh charge is to be introduced, and this inert bulk may vitiate the fresh charge so as to render it difficult of ignition when compressed. Many attempts have been made to perfectly clear both the cylinder and the combustion chamber of burned gasses, none of which have come into general use.

The burned gas content of the combustion chamber is far from being an unmixed evil in gas engine operation. The burned product reduces the bulk of the fresh charge drawn into the cylinder, and as this inert mass is driven before the incoming charge to the less heated end of the water jacketed cylinder, it assists in heating the incoming charge and so aids in preparing for rapid combustion. The presence of the burned products also leads to a lower terminal cylinder pressure, and these are valuable features. The spark points may be so placed that after the charge is compressed they are surrounded by burned product, in which case the charge ignition becomes uncertain, or fails altogether. It may be safely assumed, however, that with simple forms of combustion chamber, the burned product will be driven into the cylinder ahead of the incoming charge, and that the relative positions of the burned and unburned parts of the charge will not be altered during compression. If this assumption is correct, then the spark points should be placed as near the point of charge admission as possible, as they will there be the more likely to be surrounded by the fresh charge.

So far as can now be seen, the final automobile will have electric spark ignition, and will also have a sufficient supply of electric current to supply white lights in front and a red light at the rear of the vehicle. This system of lighting seems a necessity, but demands more current than can be readily supplied by the use of primary batteries. Hence i seems probable that the final automobile will be equipped with a dynamo driven by its motor, and with small storage batteries to store the dynamo-generated current in sufficient quantity to supply the vehicle for at least 25 miles travel, so that in case of failure of the dynamo the wagon can run to a base of supplies. This electrical equipment cannot be had, probably, under 50 pounds in added weight, and perhaps considerably more will be required to make a thoroughly reliable electrical outfit. The United States Storage Battery Co. supply a small dynamo

weighing only about 20 pounds, which is said to be sufficient for wagon motor ignition with any number of cylinders likely to be employed, and the same company also furnishes a very light storage battery of suitable capacity, the whole outfit weighing only about 45 pounds. Some of the magneto spark-producing arrangements are said to be wholly satisfactory, with very much less weight than is here specified. It is not easy, however, to obtain reliable mechanical results, either with electrical appliances or anything else, without the employment of mechanical elements of ample weight and capacity, and the probabilities seem therefore strongly against the acceptability of very cheap or very light electrical equipments for internal combustion motor driven wagons.

Returning now to the question of time available for combustion, which appears to demand a much more careful consideration than it

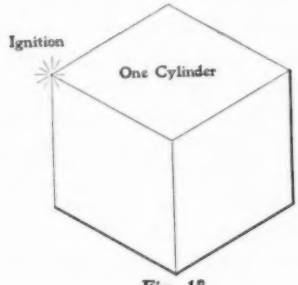


Fig. 18

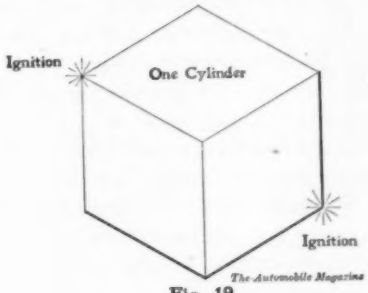


Fig. 19

has received from wagon motor designers so far, a series of simple diagrams are here introduced for graphically exhibiting the combustion time gains which may be had by multiplying the points of charge ignition. These diagrams are made to scale, and each figure correctly represents to the eye the same bulk of cylinder charge, differently ignited, either by multiplying the points of ignition of a single charge, or by dividing this charge so that its parts may be separately ignited. Koch, who has been a very persevering investigator in the use of kerosene for wagon driving, claims to have gained a great degree of success by the use of a large hot tube, so placed as to ignite the single cylinder charge at many different points simultaneously. It is also well known that the admixture of burned gases makes the charge combustion slower. Very little has been written, however, in regard to the value of extending the combustion time in internally

fired cylinders ; most designers appearing to regard the firing of the charge as an instantaneous operation, and making no direct effort to increase the charge burning time.

Referring to the diagrams, Fig. 18 shows a charge of given bulk, ignited at a single point, in a single cylinder, the Otto cycle being supposed in all cases here illustrated. In this case the charge combustion time is one-quarter of the total running time of the motor. Common motor speeds in wagons vary from say 400 to 1,000 crank shaft turns per minute, calling for from 800 to 2,000 piston strokes, each having a time duration of 3-40 of one second for the longest time of charge combustion, to 3-100 of a second for the shortest time of burning. These are very short periods of time in which to completely effect a chemical change in a considerable volume of matter. Referring to Fig. 18, it will be noticed that the ignition, taking place as shown at one corner of the cube, is at the least favorable point for quick action, and that the best place for lighting the charge to obtain rapidity of burning is at the central point. This central ignition is, however, impossible with most or all forms of motors commonly employed, it being quite common to ignite the charge at a point little more favorable to rapid burning than that shown in Fig. 18. Fig. 19 shows the same bulk of fuel fired simultaneously at two points separated as far as possible from each other. It seems only reasonable to suppose that perfect combustion could be obtained in half the time by lighting as shown in Fig. 19, which would be needed to secure the same result in Fig. 18. It will also be noted that with the charge burned in a single bulk, as in Figs. 18 and 19, the motor shaft receives a turning impulse during only one-fourth of the total time of motor action, and hence a heavy fly-wheel must be used to obtain an even passable approach to continuous driving action.

In Fig. 20 the same bulk of fuel is shown divided into halves, separately ignited. Here the total charge burning time becomes one half the total running time of the motor, and if the pistons are placed in separate cylinders, a turning impulse may be given to the shaft during one half the total time of running. It is, however, quite common to place two pistons in one cylinder, and have them make simultaneous working strokes away from each other, thus obtaining the certain advantage of possible perfect running balance, and the questionable advantage of a total cylinder clearance of burned product. In this case, however, the time of crank turning effect remains only one quarter of the running time, same as if only one piston were used. With

two pistons running away from each other in one cylinder, the ignition taking place in the middle of the compressed charge and the burning proceeding in both directions, the combustion would have double the time due to ignition as shown in Fig. 18, and this is the arrangement employed by Koch, before mentioned.

Fig. 21 shows the constant bulk of charge divided into four equal parts, separately ignited, thus obtaining the whole time of motor running for the charge combustion. It is now common to place 4-cylinder motors in wagons, thus obtaining a crank turning impulse for each half turn of the shaft, and so very greatly reducing the fly-wheel weight needed. The objections urged against cylinder multiplication by the single cylinder motor advocates, are increased complexity and increased liability of derangement and increased cost, owing to the increased number of parts. There is another objection to the multiple cylinder motor, not commonly urged, but valid, in the increased quantity of electric current needed to produce the sparks. The production of an igniting spark for a small cylinder demands as much current as for a large cylinder.

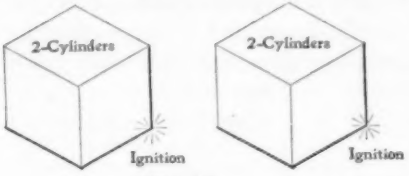


Fig. 20

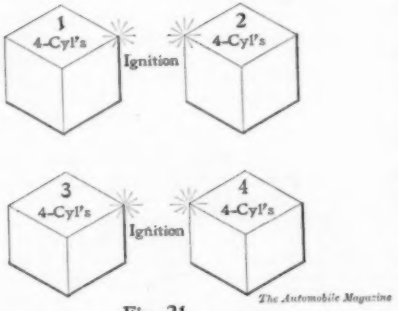


Fig. 21

The other objections to increasing the number of cylinders in a wagon motor are at least open to question. For efficient light wagon driving, a single cylinder diameter of 6 inches is not too much, and a cylinder of this diameter is too large to be readily handled through ordinary automatic tools. Four 3-inch diameter cylinders, giving equal piston area with much less total weight, owing to fly-wheel reduction, could be machined probably for less cost than the single 6-inch cylinder, all parts included. As to liability of derangement and certainty of the possibility of continued working, the advantages are with the multiple cylinders. If anything goes wrong with a single-

cylinder motor, the wagon must stop, while with a four-cylinder motor two cylinders could be out of action while the other two would still be able to drive the wagon at a fair rate. The most severe service demanded of piston and cylinder motors is in ocean steamers, and the cylinders of screw driving steam engines have been increased from the original form of a single cylinder driving a single screw, to eight cylinders driving two screws, with a great increase in the certainty of continuous turning for from 6 to 8 days consecutively.

Very compact arrangements of four or six cylinders are possible, which include perfect running balance among their other advantages, and the continuous torque, lightness and certainty of action given by an increased number of small cylinders, would seem to render the exclusive adoption of multiple cylinders for road wagon motors a certainty in the final automobile.

The Automobile Index

Everything of permanent value published in the technical press of the world devoted to any branch of automobile industry will be found indexed in this department. Whenever it is possible a descriptive summary indicating the character and purpose of the leading articles of current automobile literature will be given, with the titles and dates of the publications.

Illustrated articles are designated by an asterisk (*).

***Accumulator, The Heiny—**

Description of a new form of accumulator, which is said to possess unusually long life. "La Locomotion Automobile," Paris, January 10, 1901.

***Belt Transmission for Automobiles, Automatic—**

Description of a motor vehicle, where belts are used instead of chains for transmitting the power. "Horseless Age," New York, January 30, 1901.

Bodies, Designing of Carriage—

A short editorial, calling attention to the importance of paying due respect to the beauty and gracefulness of outline of that particular part of self-propelled vehicles. "Automobile Magazine," New York, February, 1901.

***Car, The Centaur—**

Description of a carriage, the principal features about which are accessibility of parts and simplicity. "The Autocar," London, January 26, 1901.

***Carburetors, Some New—**

Descriptions of two French carburetors, which are reported to give excelient service. "Motor Car Journal," London, January 26, 1901.

***Carburetor, The Georges Richard—**

This is of the constant level type, the inrushing air vaporizing the gasoline by dashing it between the surface of an inverted cone and a corrugated surface. "Automotor Journal," London, January, 1901.

Chicago and Vicinity, The Automobile in—

E. C. Oliver. An article dealing with the status of the automobile in the great Western city. "Horseless Age," New York, January 9, 1901.

***Cleveland to New York, From—**

By Alexander Winton. Interesting account of experiences through which the author passed while traveling between the cities mentioned, on an automobile. "Automobile Magazine," New York, February, 1901.

Clubs, American Automobile—

History of the clubs in this country which are devoted to the fostering of automobilism in its various phases. "Horseless Age," New York, January 9, 1901.

Cylinders of Hydro-Carbon Engines—

A short article, calling attention to the need of good workmanship and proper design. "Automobile Magazine," New York, February, 1901.

***Daimler Car, How to Drive It, The—**

By R. J. Mecredey. Gives valuable pointers for users of Daimler carriages. "Motor News," Dublin, January, 1901.

Design, Automobile Engine—

A letter from Charles E. Duryea, in which he takes to task Mr. Hobart's article, published in a former issue of the "Age of Steel." In that article Mr. Hobart called attention to the great mistakes that up to the present have been made by automobile gas engine designers. "Age of Steel," St. Louis, January 26, 1901.

***Dick Turpins Awheel—**

By Percie W. Hart. This is an interesting automobile story, written by one who is a frequent contributor to the best monthly magazines. The illustrations are by H. J. Wibel. "Automobile Magazine," New York, February, 1901.

Electric Automobile, The—

Criticism of the articles by R. A. Fliess, which were reprinted in the AUTOMOBILE MAGAZINE for October and November, 1900. "La Locomotion Automobile," Paris, December 20, 1900.

***Electric Vehicle Transportation Co., The New Station of the—**

R. A. Fliess. Minute description of this new plant. "Electrical World and Engineer," New York, January 12, 1901.

***End to End, From—**

Hubert Egerton. Description of a trip taken by the author, between John O'Groat's and Land's End. "Motor Car Journal," London, January 5, 1901. (See under Locomobile.)

***Engine, The Sweet Automobile—**

This is a steam engine, the entire control of which is actuated by a single lever. "Automobile Magazine," New York, February, 1901.

Evolution, Automobile—

An historical article dealing with the development of the electric automobile. W. H. Maxwell, Jr. "Electrical Review," New York, January 12, 1901.

***Gasoline Carriage, The Turrell—**

The main feature of this vehicle is that no attempt has been made to construct a rigid frame. "The Autocar," London.

***Gearing—**

By E. C. Oliver. This is article No. 3 of a series in which the author goes into the problems connected with the laying out of bevel gears. "Horseless Age," New York, January 23, 1901.

Housing of Automobiles—

By Albert L. Clough. Goes into the questions involved in the housing of automobiles. "Horseless Age," New York, January 30, 1901.

***Ignition, Electric—**

Sidney F. Walker. First part of a contribution in which the author gives simple data for those not particularly well informed on this subject. "The Autocar," London, January 5, 1901.

***Kerosene Motor Driven Vehicle, A—**

Description of the Roots & Venables carriage, which is claimed to be the only successfully operated vehicle of its kind built. "Automobile Magazine," New York, February, 1900.

***Locking Devices—**

Description of various plans intended to lock machines against tampering by those not familiar with their operation. "Horseless Age," New York, January 9, 1901.

***Locomobile, From End to End on a—**

By H. W. Egerton. Part 2 of a series of articles descriptive of a tour from Land's End, in England, to John O'Groat's, the most northerly point in Scotland. In this story the author goes into the various incidents of the trip. "The Autocar," London, January 19, 1901.

***Military Motor Car—**

Description of a wagon designed for war purposes. It is fitted with a Daimler engine which is placed at the front. An intermediate shaft is carried from which the rear axle is driven by means of sprockets and chains. "La Locomotion Automobile," Paris, December 27, 1900.

***Motor Bicycle—**

A description of the Baines Machine, in which a 1¾ h.-p. De Dion motor is used. The valve box has been moved from the side to the front, which reduces the width. "Motor Car Journal," London, January 26, 1901.

Motor Cars—

Abstract of a paper read by J. W. Roebuck before the Crewe Mechanics Institute and Scientific Society. The writer describes cars of various makes, going into their several interesting features. "The Autocar," London, January 19, 1901.

***Motor Car, The Bardon—**

Description of a new French carriage. "Motor Car Journal," London, January 12, 1901.

***Motor Car, The Vinot-Deguingand—**

Description of a French vehicle which is fitted with a two cylinder vertical engine. The engine is mounted in the front, as is common on French machines. "The Motor Car Journal," London, January 19, 1901.

***Motor Vehicle, Construction of a Gasoline—**

The concluding article of a series by C. C. Bramwell, which will be issued in book form later. "Motor Vehicle Review," Cleveland, January 10, 1901.

***Omnibus, The First Successful Pneumatic-Tired—**

By Echaudé. An interesting account of the trial of a De Dion 'bus. "The Autocar," London, January 19, 1901.

Paris, Automobile Notes from—

Leopold Canning. "Motor Car Journal," London, January 12, 1901.

Paris, The Electric Automobile in—

Hart O. Berg. The writer refers in his article to the gradual displacement of the petrol or gasoline motor by the electric automobile. He thinks the American vehicle will be the most popular over there. "Electrical World and Engineer," New York, January 12, 1901.

Physician, The Automobile for the—

By E. C. Chamberlin, M. D., in which a plea is made for the advantages of the motor vehicle in the conducting of a medical practice. "Automobile Magazine," New York, February, 1901.

***Roads of the World, The—**

L. Lodian. The author goes into the construction of early roads, arguing that they were nearer being right than the modern roads. "Automobile Magazine," New York, February, 1901.

***Runabout, The Woods Electric—**

Description of a neat and reliable carriage, which is beautifully finished. "Automobile Magazine," New York, February, 1901.

***Speed Gear, An Improved Panhard Variable—**

A new device whereby is obviated the abandonment of the first and second speed gears used on Daimler and Panhard cars. "Motor Car Journal," London, January 5, 1901.

***Snow, Driving an Automobile through the—**

Interesting description of a trip taken in a 16 horse-power Napier. "The Autocar," London, January 26, 1901.

Springs, Adjustment of Valves and their—

(See under Valves.)

***Springs for Automobiles—**

By M. C. Krarup. In this article the author goes into the problems connected with the design of springs. "Horseless Age," New York, January 30, 1901.

***Steam Carriage, The Kidder—**

Description of a vehicle which embodies a number of new points. Two engines are used, one on each side of boiler. "Horseless Age," New York, January 23, 1901.

Steam Carriage, Three Thousand Miles with a—

By George E. Greenleaf. An article in which the author gives a great many suggestions to users of this class of vehicles. "Automobile Magazine," New York, February, 1901.

***Steam Wagon, The Musker—**

(See under Wagon.) "Automotor Journal," London, January, 1901.

***Trucks, Steam versus Horse Drawn—**

By H. G. Chatain. An article in which is given the relative cost of operating horse as against steam drawn trucks for heavy loads. Contains a number of tables. "Automobile Magazine," New York, February, 1901.

Valves and their Springs, The Adjustment of—

By A. Oulion, in "La Locomotion Automobile," of December 20, 1900. (See under Springs.)

***Voiturette, The Valkyrie—**

Description of a new carriage, having the motor located in the front, the transmission mechanism being similar to that used on the Renault carriages. "Motor Car Journal," London, December 29, 1900.

***Wagon, Adams Express—**

By Daniel Bellet. Description of the truck designed and built for the company named, by its mechanical engineer, Arthur Herschmann. "La Locomotion Automobile," Paris, January 10, 1901.

Wagons, Operation of Electric Delivery—

W. H. Maxwell, Jr. This article treats of the general precautions necessary in the operation of such machines. "Automobile Magazine," New York, February, 1901.

***Wagon, The Musker Heavy Steam—**

Description of a heavy wagon, among the chief features of which may be mentioned the peculiar suspension of the propelling mechanism and the boiler. The entire machinery is carried on separate underframe, independently suspended by springs from front and rear axles. "Automotor Journal," London, January, 1901. (See under Steam.)